PROGRAM IMPLEMENTATION PLAN
FOR THE
ENHANCED TERMINAL VOICE SWITCH (ETVS)
CIP # C-05
ISD   (10/98)

[http://ans.faa.gov/ans700]

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

September 25, 1998

FOREWORD

This Program Implementation Plan provides management direction, technical information and guidance to all levels of the FAA that are involved in the Enhanced Terminal Voice Switch (ETVS) program implementation.

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Document Change Notice

1. Originator Name and Address	2. ( ) Proposed	3. Code Identification	4. Standard No.
AND-320	(X) Approved	5. Code Identification N/A	6. DCN No.
7. System Designation NAS	8. Related ECR/NCP No. See #14	9. Contract No.	10. Contractual Activity N/A
11. Program Implementation Plan for Enhanced Terminal Voice Switch		12. Effectively N/A	

This notice informs recipients that the standard identified by the number (and revision letter) shown in block 4 has been changed. The pages changed by this DCN (being those furnished herewith) carry the same date as the DCN. The page numbers and dates listed below in the summary of changed pages, combined with non-listed pages of the original issue of the revision shown in block 4, constitute the current version of this specification.

13. DCN No.	14. Pages changed	S*	A/D*	15. Date
*	This is an initial issue			9/13/94
A	This is a complete revision.	S*		4/22/96
B	This represents a complete revision			9/25/98

S* = Indicates Supersedes Earlier Pages   *A = Indicates Added Page   *D = Indicates Deleted Page

PRODUCT IMPLEMENTATION ASSESSMENT

The Product Implementation Plan (PIP) provides information to help assess the implementability of new system or service.

Your feedback is important to making appropriate adjustments to implementation strategies and plans

Please use this PIP to support your evaluation of the planned product implementation. Send your feedback to:

Vinod Bhatnagar_____, Associate Product
 Lead for NAS Implementation (APLNI), ANS-700.

Requests for additional product information may also be directed to the APLNI. Your input and requests will be promptly addressed.

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1.0   GENERAL

1.1   Purpose of Document

The Program Implementation Plan (PIP) provides management direction and guidance for the implementation of the Enhanced Terminal Voice Switch (ETVS) program, and is to be used for all ETVS technical and resource planning activities.

1.2   Scope of Document

The PIP is applicable to all levels of the Federal Aviation Administration (FAA) that are responsible for implementing the ETVS Project. It is an iterative document and will be updated during subsequent phases of the acquisition. Consequently, information required for specific sections may not be available at the time a particular version is issued. These sections are annotated with the acronym "TBS " to be supplied. The contents of this PIP are organized by the eleven essential elements of information as defined in FAA Order 1810.1F and documents the strategy, requirements activities, and responsibilities necessary to support deployment and operation of ETVS in the field. This PIP also has three attachments, Appendix A, The Generic Site Implementation Plan (GSIP), Appendix B, Acronyms, and Appendix C, Site Deployment Schedule. The GSIP is a generic site configuration task list using technical information from the PIP and defines activities to be accomplished during each of the seven phases of implementation described in Chapter 13. The ETVS Pre-Product Improvement Items (P^3I) items, listed in Table 2-1, are being developed in parallel with the basic system, therefore this document does not include specific P^3I product deployments.

1.3   Distribution

This plan should be distributed to the team level of the Air Traffic Service, Airway Facilities Service, Office of Independent Operational Test & Evaluation, Office of Acquisitions, Office of Air Traffic Systems Development, Office of Communications, Navigation & Surveillance Systems, Office of System Architecture & Program Evaluation, and Office of Human Resource Management. This plan should be distributed to the branch levels of the FAA Technical Center (FAATC); the regional Air Traffic, Airway Facilities, and Logistics Divisions; and the Mike Monroney Aeronautical Center's Office of Facility Management and FAA Logistics Center. Also this plan should be distributed to Air Traffic and Airway Facilities field sites.

1.4   Definition of Terms

Interphone Calls (IP) - ground-to-ground calls between separate Air Traffic Control facilities, an IP call goes out of the ETVS through a Ground-to-Ground (G/G) interface.

Intercom Calls (IC) - ground-to-ground calls within a facility (i.e., between positions within the ETVS), an IC call never leaves the ETVS.

Direct Access (DA) - calls use pre-assigned DA selectors to place a call

Indirect Access (IA) - calls use a standard Dual Tone Multi-Frequency (DTMF) keypad to place a call.

DA Selectors (latching vs. non-latching) - a "latching" DA selector stays engaged after it is depressed, to disengage the DA, simply push it again. A "non-latching" DA selector is only active when it is depressed.

Voice Calls - a voice call is commonly called a "shout line", an interphone line, select the interphone channel and start talking. The person at the other end will not hear a ring and will not have to take any action. The called party will have to select their voice call button to respond to the call.

Manual Ringdown Manual ringdown calls use an interphone (ground-to-ground) trunk line which is set up as a "ringdown" trunk.

Common Answer (CA) - Common answer refers to a method of answering incoming calls. When a G/G call comes in from any position for which you don't have a DA selector assigned, the call will go into the "common answer queue", the CA selector will light up.

Override Calls - Any position can place an override call. This allows the overriding position to break into the G/G communication occurring at the "overridden" position without the overridden position taking action to answer the call. The overriding position can hear all communication (Air-to-Ground (A/G) and G/G) going on at the overridden position.

Call Forwarding - Call forwarding allows you to redirect future calls made to your position to another position that you designate. Call forwarding, in conjunction with frequency forwarding (described later) allows a position to temporarily transfer air traffic control to another position (e.g., during a personal emergency). Call forwarding can be "chained" to allow sites to combine up to fewer positions during off-peak hours. Up to 10 positions can be contained in a call forward chain, but chains cannot be circular. This prevents a position's calls from being forwarded back to itself in an endless loop. You can still place calls from a position that has its incoming calls forwarded to another position. An unattended position that has been call forwarded to another position will not accept a reconfiguration map from the system until the reconfigure enable DA is selected. When the reconfiguration is accepted, any call forward chain in which the position is participating will be broken.

Conference Calling - The conference originator adds conferees to the call. This is called a "progressive" conference. There is a six party limit on ETVS conference calls. There is also an IP conference function, which allows multiple (up to six) parties to join a voice call. An operator can override a conferee to join a conference call.

Supervisory Monitoring - Designated supervisory positions will allow the simultaneous monitoring of communications at up to three ETVS positions. The monitor can hear the monitored position(s) without being heard. Position monitoring is considered a classmarked function, which means it is determined by the password the supervisor uses to access the supervisory position.

Position Monitoring - Designated operator and supervisory positions can monitor operator positions by selecting a preassigned DA key or dialing in the appropriate code on the IA keypad.

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Operator positions can monitor at least one other position while supervisory positions can monitor at least three operator positions. The monitoring position will be able to hear all audio present at the monitored position's headset jack and loudspeaker (i.e., all incoming and outgoing audio for both A/G and G/G calls) without being heard. Placing or answering a G/G call or placing an A/G call at the monitoring position places the monitored position's audio on hold. Upon release of any G/G call or Push-to-Talk (PTT) at the monitoring position, monitoring is resumed.

Caller ID - For incoming calls on private lines that provide caller identity information (e.g., FAA Type 20 trunks), the ETVS will decode this information and show it at the IA display, even if the call appears as a DA. For calls answered via the Common Answer function, the ETVS will display the position identity (for IC calls) or G/G trunk circuit (for IP calls). If caller ID is not provided or available, the G/G trunk circuit will be shown on the IA display.

Frequency Add and Delete - The ETVS permits operators to add frequencies to their position, depending on the number of frequency selectors at the position, or delete frequencies from their position. This capability is provided by assigning a Frequency Add/Delete DA selector to the position.

Frequency Forwarding - The ETVS permits operators to temporarily forward control of their assigned frequencies to another position. Frequency forwarding will effectively add the frequencies to the forwarded-to position not already assigned to that position. Frequency forwarding will only be executed when the forwarded-to position gives positive confirmation of the command.

Local Preemption - Preemption means taking over and using a frequency regardless of whether others are using it at the time. As with the frequency add and delete capability, frequency preemption is a classmarked function. In other words, your position must be set up to allow you to preempt on frequency "X" for you to actually preempt another operator. If your position is classmarked to allow preemption on frequency x and not on frequency y, you will not be able to preempt on frequency y. If two positions are classmarked for preemption on frequency x, it becomes a first come, first served arrangement. If you preempt frequency "X" first, other positions with preemption capability on frequency x will not be able to preempt you. So operators take heed. Preempt early and often.

Remote Frequency Interlock - Remote frequency interlock permits two Air Traffic Control (ATC) facilities to share the use of one set of radio equipment, coordinating via a government furnished remote frequency interlock trunk (a 4-wire Ear & Mouth (E&M) or equivalent) G/G trunk (i.e., one frequency per trunk).

Remote Preemption - Remote preemption is similar to remote frequency interlock except that operators at one of the two facilities can preempt communications on the frequency by operators at the other facility.

Turnkey Installation - means that the contractor will arrive at your facility with the ETVS equipment, off-load it and put it in place, run cables, hook up the equipment, perform site installation, integration, and acceptance testing.

Basic Operator Panel - The Basic Operator Panel (BOP) is an LRU (line replaceable unit) and comes in two versions - an Integrated BOP (IBOP) and a MiniBOP, which is smaller and fits within the space between Terminal Radar Approach Control (TRACON) console separator posts.

Integrated BOP - The IBOP has the position electronics "integrated" within it. The front panel layout includes 22 assignable pushbuttons, an override indicator, and four fixed-function pushbuttons physically identical to the DA selectors. A second section of keys provides a 4x3 DTMF (i.e., standard telephone) keypad and four additional function buttons used for selectors that do not require status indication (i.e., Release, Hook Flash, Hold, and Ring). The IBOP also contains four volume controls and two dimmer controls for backlight and indicator brightness adjustment. Each of the 22 DA selectors may access an intercom circuit, a telephone circuit, or a special function. DA selector assignments can be changed through reconfiguration at the supervisory terminal. Additional DA selector modules can be added to a position with an IBOP to provide the maximum of 50 DA selectors defined by the ETVS specification. Legend strips for the selector indicators can be replaced by removing the IBOP retaining screws from the panel and titling it out. It is not necessary to dismantle the module.

MiniBOP - The MiniBOP is identical to the IBOP except that it only contains 7 assignable DA selectors, it contains an integrated IA display module, and it has an extra set of a potentiometers for the MiniBOP position's trainee and instructor headset volume controls. Basically, the MiniBOP is an IBOP without as many DA selectors, integrated with a split position IA display module, that is resized to fit within the separator posts in a TRACON console.

Speaker Module - The speaker module contains a digital/analog converter, a chime circuit, a power amplifier, and a 4 Watt speaker.

Jackbox Module - The position jackbox module is a hardwired connector interface for the operator's headset/handset. The jackbox module mounts within a position console's writing shelf or similar location. Two jacks are provided; one labeled "Instructor", and the other labeled "Trainee".

Direct Access (DA) Module - If the position requires additional selectors beyond the 22 provided on the Basic Operator Panel (BOP), supplementary 20 and 35 button DA modules are provided. The DA modules supply single push-button access to intercom, interphone, and special functions. The ETVS also supports a programmable DA module that contains 4 select buttons and 4 Liquid Crystal Display (LCD) displays. Each LCD display is associated with button and supports an 8 character display, which describes the associated function (special function, intercom, interphone).

Radio Frequency Selector Module - Each radio module assembly has four radio selectors and four radio frequency displays. Radio modules provide headset/loudspeaker, transmit and receive select, and transmit and receive main/standby selectors for each of the four radio displays. A

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maximum of four radio frequency selector modules are able to be integrated into one operator position and still meet ETVS position size requirements. Each module supports eight radio frequencies (four at a time) by using a paging scheme. This provides a maximum of 32 radio frequencies per position. The electrical and interface characteristics will support eight individual radio frequency selector modules (without paging) if the position panel space is available.

Touch Entry Device (TED) - In addition to traditional key and lamp position equipment, TED positions are offered with the ETVS that will provide the same functionality in a smaller panel space. TED positions are available for both Tower and TRACON installation. The Tower TEDs provide enhanced backlight capability to compensate for high brightness cab environments. The TRACON TEDs are narrower than their Tower counterparts so they fit within the standard 10" separator post found in most FAA TRACONs. The TRACON TEDs do not provide the high brightness backlight capability of the larger Tower units.

A TED position provides access to up to 30 radio frequencies and 66 DA selectors. The Radio frequency selectors occupy the left half of the TED display. The two standard pages of DA selectors occupy the right half of the TED display screen, while DA page 3 covers the radio frequency selectors on the left half of the display. The radio frequencies appear as five pages of six frequencies. In addition to the five pages of frequencies, there is a Radio Summary page that provides summary information of all 30 frequencies on one five column by six-row screen. The DA selectors are presented as two independent pages of 18 selectors. In addition, DA page 3 provides an additional 30 selectors. While DA page 3 is visible, the two 18 selector DA pages can be toggled independently, providing access to up to 48 DA selectors at a single time.

TED Control Module - The TED control module provides potentiometers for the position's trainee and instructor headset volume controls, as well as a potentiometer to control illumination of the TED.

FAA Site Survey - identifies the work necessary for site preparation. Approximately six months prior to shipment, the contractor will send a representative(s) to the site to verify information contained in the site survey worksheets completed by the Site and Regional FAA personnel. The contractor will need the current facility layout drawings, including console layouts, equipment room layout, and Intermediate Distribution Frame (IDF) drawings. Acronyms used in this document are contained in Appendix C. (Source: ETVS Technical Data Package, 12/8/95,p.7)

1.5   Cancellation
Not applicable (N/A).

1.6   Authority to Change
Authority to change this PIP rests with the Product Lead for Voice Switching and Recording, AND-320, and the Associate Product Lead for National Airspace System (NAS) Integrateion (APLNI), ANS-700. All changes, updates, and revisions to the PIP will be made by the Associate Product Lead for NAS Integration (APLNI) for ETVS.

1.7-1.19 (Reserved)

1.20   Risk Assessment Overview

Each Chapter in the PIP concludes with a risk assessment that addresses the plans or solutions being considered to mitigate the issues and problems identified therein. The risk assessment considers all available information/data. The risk assessment will be updated as additional information is received and will be provided as a revision to the PIP.

The ETVS risk management process, as defined in the ETVS Risk Management Plan, will involve the identification, analysis, evaluation, mitigation, and monitoring of risks associated with the implementation of the ETVS project. Risks can be identified through any source providing insight into the program. Once a risk has been identified, documented, and reported to management, the risk issue is assigned by the relevant Associate Program Manager to an actionee, who will perform a risk analysis. Once a risk is identified, analyzed, and ranked, a mitigation plan is prepared, and the analysis finding along with the recommended mitigation plan is forwarded to the Risk Evaluation Board for evaluation and approval. Once a risk mitigation plan has been established, accurate documentation and continued evaluation are important to assure that:

- The expected results are obtained;
- Factors attendant to the risk have not changed; and,
- No new risks have been introduced.

Refer to section 12.4.2 of this document for more detail on risk management.

2.0   PROGRAM OVERVIEW

2.1   Synopsis of Mission Need

The FAA has various terminal voice switch communications systems in its present inventory which have embedded technology that is 15-20 years old, must rely on costly contractor support, and have reached the end of their useful life and need to be replaced. These switches marginally support today's Air Traffic (AT) requirements and cannot satisfy future needs. Existing deficiencies include limited expandability and back-up communications, primarily analog architecture, limited human factors and management support capabilities, and lack remote maintenance monitoring capabilities. The ETVS will replace the aging electromechanical switches. The ETVS will take advantage of the rapid advances in telecommunications technology to satisfy the need for reliable A/G and G/G voice switching communications functions between air traffic controllers, pilots, and ground based air traffic facilities. These communications functions are required in facilities ranging from level II Airport Traffic Control Towers (ATCT) to level V consolidated ATCT/ TRACON facilities with up to 80 operational positions.

Because of its planned modular design, ETVS will be able to more readily accommodate changes in air traffic volume than current systems simply by adding interface card(s) and/or position modules(s). Because of the higher reliability and maintainability, it is expected that the ETVS will have significantly lower maintenance costs than the existing voice switching systems. Government technicians will be able to perform site maintenance, thereby eliminating the requirements for contractor site maintenance. (Sources: ETVS Mission Need Statement and Cost Benefits Analysis).

2.1.1   Operational Needs

The ETVS will meet operational needs, the following highlights some of those operational needs:
- Access to A/G (radios) and G/G (intercom or interphone) communications from any operational position.
- Interface capability to air traffic control legal voice recorders.
- Access to an administrative telephone system, such as the Operational Support Telephone System (OSTS).
- Dynamic reconfiguration of operational position equipment.
- Capability for voice switch expandability to keep pace with expanding requirements.
- Capability to provide Remote Maintenance Monitoring (RMM) of voice switches.
- Improved human-machine interfaces.
- Improved management support systems to reduce workload of controllers and supervisors.

2.1.2   Strategic Goals

The ETVS will be installed in approximately 450 sites over a ten-year period. Core ETVS equipment will incorporate Non Developmental Item (NDI) technology supporting up to 80

operational positions. The P^3I items, listed in table 2-1, may be incorporated over time, based on the system capabilities and changing communications requirements. The ETVS will integrate changes to voice switching systems to improve the reliability, expandability, flexibility, and simplicity of the switch. Improvements over currently available terminal voice switching systems include:

- Remote Monitoring Subsystem (RMS) to collect and report maintenance related data to other components of the Remote Maintenance Monitoring System (RMMS);
- Cross connect interfaces for monitoring of the Automated Terminal Information Service (ATIS);
- Provisions for a Management Information System (MIS) to automatically collect routine administrative and personnel data, greatly reducing the workload of the air traffic supervisor;
- Communications Traffic Data (CTD) and system event collection and reporting to provide an accurate summary of communications utilization data and information on position activity for use by supervisory and maintenance personnel in system troubleshooting, incident investigation, resource allocation, and workload assessment;
- Informal recording capability at the supervisory position to record incoming or outgoing calls to any position for use by supervisors in assessment of controller performance; and,
- Digital Ground-to-ground (G/G) communications interfaces for connecting the ETVS to digital carriers, such as T-1 and Integrated Services Digital Network (ISDN).

Potential ETVS Pre-Planned Improvements (P^3I)
Digital interfaces (i.e., ISDN, T-1, etc.)
Automated Terminal Information Services (ATIS)
Management Information System (MIS)
Communications Traffic Data (CTD) and system event collection and reporting
Remote Monitoring Subsystem (RMS) and Maintenance Data Terminal (MDT) interface
Four jack position operation
Type-20 trunk interface (VSCS to voice switch interface)

Table 2-1: Potential ETVS Pre-Planned Product Improvements (P^3I)

2.2   Functional Description

Figure 2-1 illustrates the connectivity of the ETVS. Detailed functional and technical requirements can be found in the ETVS Operational Requirements Document (ORD) and FAA-E-2894, Enhanced Terminal Voice Switch Specification. A discussion of the general functional capabilities of the ETVS follows.

2.2.1 Communications Features

The ETVS will provide G/G and A/G communications to ATCTs, TRACON facilities, and other remote FAA and non-FAA locations. Communications capabilities will include direct and indirect access intercom and interphone communications, with or without override. The ETVS will also interface to analog G/G carriers and A/G radio equipment.
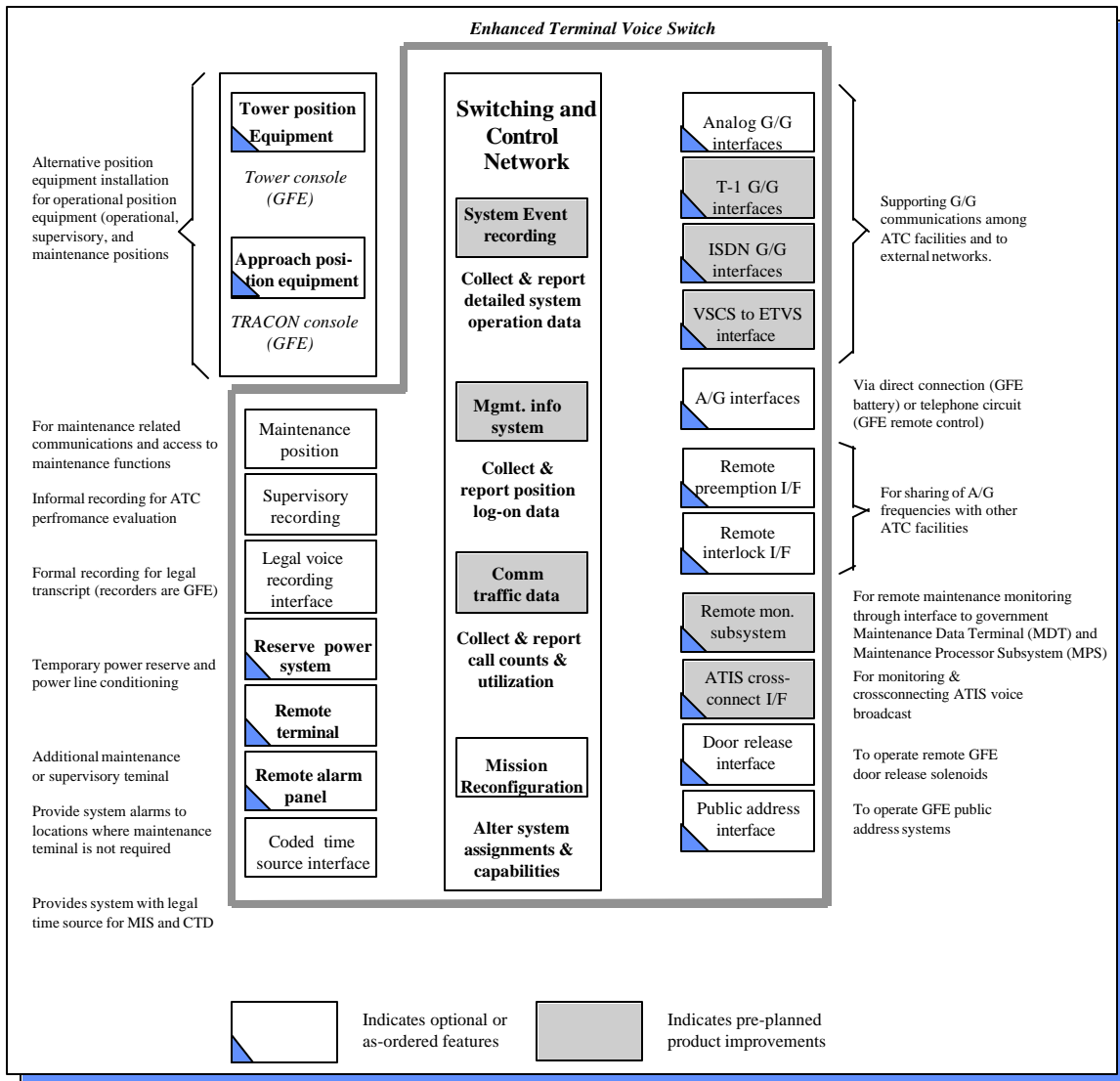
Figure 2-1: ETVS Functional Block Diagram

2.2.2 Supervisory Features

Supervisory features of the ETVS include the capability to record incoming and outgoing calls at any operational position, display of pending maintenance alarms, and an audible alarm for un-monitored frequencies. A Management Information System (MIS) will provide supervisors with routine administrative and personnel data (position utilization, training, and supervision). Communications Traffic Data (CTD) and system event collection and reporting will provide a summary of communications utilization, and more detailed position activity information, to both supervisory and maintenance personnel. Both the MIS and the CTD are P^3I items.

2.2.3 Maintenance Features

ETVS systems include automated diagnostic equipment that provides real time monitoring of critical system components. Aural and visual alarms located at a maintenance position and at

designated operational positions will alert personnel of failures. A diagnostic display terminal will identify the defective component(s) to the Line Replaceable Unit (LRU) level.

2.2.4   Special Features

The ETVS will provide software controlled functional reconfiguration capabilities to air traffic supervisors for changing interphone, intercom, and radio frequency connectivity within a facility. One or more designated interactive terminals will provide computer-based reconfiguration for single positions or all ETVS positions. As directed by Air Traffic Plans and Requirements Service, maintenance personnel can accomplish physical reconfiguration by the addition of single positions or single external interfaces to the system.

The ETVS may interface to the Maintenance Processor Subsystem (MPS), located at Air Route Traffic Control Centers (ARTCCs), through the Remote Monitoring Subsystem (RMS). The RMS will integrate the ETVS into the Remote Maintenance Monitoring System (RMMS). RMS implementation, if ordered, will take place as a P^3I subsystem.

2.3   Program History & Status

In 1988, the Tower Communications Switch (TCS) project was developed to replace electromechanical voice switches with "end-state" voice switching equipment. The TCS was to procure voice switches for towers in the Advanced Automation System (AAS) environment. The TCS project, however, was deferred in 1990 after a review of field requirements revealed an immediate need for voice switches to fulfill communications requirements in aging NAS facilities. The Terminal Voice Switch Replacement (TVSR) program re-scoped the Integrated Communications Switching System (ICSS) Phase 1B and Small Tower Voice Switch (STVS) projects. The STVS would replace electromechanical voice switches in facilities requiring four or fewer positions, while the ICSS Phase 1B would replace voice switches in larger facilities. A requirement remained for an "end state" voice switch that could meet the requirements of a more technologically advanced environment. The ETVS was conceived to maintain current voice switch capabilities as well as updating obsolete technology by interfacing to RMMS and digital networks, embedding both Management Information System (MIS) and Communication Traffic Data (CTD) collection capability, and providing the expandability to meet large TRACON requirements.

Development of the ETVS Mission Need Statement (MNS) occurred in April 1992. The Department of Defense (DoD) expressed an interest in participating in a joint procurement to fulfill their terminal voice switching needs for approximately 160 switches. The MNS and the ETVS program were approved at Key Decision Point (KDP) one (1) in October 1992. The ETVS Operational Requirements Document (ORD) was developed in January 1993, and on February 1, 1993 a draft specification was completed and released for industry review as part of a market survey. The market survey was completed in October and the specification was revised to reflect industry comments. An initial Cost/Benefit Analysis was also completed in October.

Acquisition Review Committee (ARC) approval (KDP-2), signaling entry into phase 3 (development phase), was conditionally granted in February 1994. A Procurement Readiness Review (PRR), was completed in June 1994, and subsequently the ETVS Request for Proposals (RFP) was released in July 1994. Contract award was made on 26 July 1995 to DENRO, Inc..

First Article (factory) Test occured in March 1997. The first operational FAA switch was fielded in May 1997 at the Santa Barbara ATCT/TRACON. The first Operational Department of Defense ETVS system was fielded at Eglin AFB.

2.4   Program Milestones

See table 2-2, ETVS Milestones, for program level milestones. Test and evaluation milestones are listed in figure 9-3, ETVS Test and Evaluation Schedule, found in section 9.2. NAS implementation milestones are listed in figure 11-1, ETVS NAS Implementation Schedule, found in section 11.1. Site implementation milestones are listed in figure 11-2, Site Implementation Milestone Schedule, found in section 11.3. Configuration management (CM) milestones are listed in figure 12-1, CM Milestones, found in section 12.5.3.

Program Implementation Milestones	Date Planned/ Accomplished
Mission Need Approved	October 1992
Specification Published	July 1994
Contract Award	July 1995
OT&E Completed	April 1998
IOT&E Completed	August 1998
Y2K Compliance Certification	August 1998
In-Service Decision (ISD)	October 1998

Table 2-2: ETVS Milestone Table

2.5   Inter-Agency Involvement

2.5.1   Department of Defense (DOD)

The ETVS program is being procured jointly by the FAA and the DoD. Responsibility for program development and contractor evaluation lies with the FAA. DoD is expected to participate in any or all phases of this activity. The DoD component responsible for procurement of the ETVS is the United States Air Force (USAF) Electronic Systems Center Communications and Airspace Management Systems Directorate (ESC/TG).

Memorandums of Agreements (MOAs) have been established between the DoD and the FAA that cover all aspects of how the coordination between the two agencies, with respects to the specifics of the ETVS procurements and implementation.

A memorandum of agreement between the FAA and DoD identifies the following number of systems: 47 systems Army, 66 Air Force, and 45 Navy

2.5.2   National Weather Service (NWS)

No interfaces with this agency exist or are expected.

2.5.3   U.S. Customs Service

No interfaces with this agency exist or are expected.

2.5.4   Drug Enforcement Agency (DEA)

No interfaces with this agency exist or are expected.

2.5.5   Other Agencies

This section is not applicable to this document.

2.6-2.19   (Reserved)

2.20   Risk Assessment

The ETVS is separated into core requirements (Non-Developmental Items-NDI) and Pre-Planned Product Improvement (P^3I) requirements, which may require development. The vendor can provide an NDI ETVS today that meets the core requirements and possibly a number of the P^3I. New technology, furthermore, is not required to implement either the core or the P^3I requirements.

3.0   AF OPERATIONS

3.1   Summary of Maintenance Operations Impacts

3.1.1   Transitory State

Airway Facility (AF) Facilities and Equipment (F&E) personnel will be involved in all phases of ETVS site implementation. F&E personnel will provide and manage electronics engineering resources and will oversee all site installation activities. Section 3.3, Facilities and Equipment provides additional detail on F&E site implementation activities.

AF F&E will also be responsible for conducting Contractor Acceptance Inspection (CAI), Joint Acceptance Inspection (JAI) and updating personnel and equipment certification requirements to reflect ETVS equipment. They will also be responsible for declaring Initial Operating Capability (IOC) and the Operational Readiness Date (ORD) for the ETVS system. Section 3.4, Systems Maintenance provides more detail regarding site implementation activities.

3.1.2   Operational State

The Government will assume responsibility for site maintenance after Contractor Acceptance Inspection (CAI). An ETVS maintenance training course (see section 8.3.1, Training Program) will be provided prior to system installation. The FAA Logistics Center (FAALC) will provide logistics (i.e., supply and depot level repair) support for the ETVS. The ETVS Integrated Logistics Support Plan (ILSP) provides a detailed explanation of the logistics support and the training provided for AT and AF.

3.2   AF Procedural Changes

3.2.1   Preventive Maintenance

Preventive Maintenance (PM) refers to those activities (adjustment, cleaning, replacement of consumables, etc.) that the ETVS supplier recommends on a periodic basis in order to maintain proper operation of the equipment. When possible, PM will be performed in conjunction with corrective maintenance. PM will not require service interruption on more than one position or external interface at a time; and the PM interval will not be required more often than once every six months. Excluding administrative and logistical time, PM of the ETVS will not require more than 2 hours per visit, regardless of system size. (Source: ETVS Specification, FAA-E-2894).

3.2.2   Corrective Maintenance

Corrective maintenance for ETVS will be accomplished by trained FAA technicians.

Regardless of size or configuration, the ETVS will exhibit a mean time between failures for access to any A/G frequency or G/G circuit from any operational or supervisory position of not less than 10,113 hours. Excluding administrative and logistical time, the ETVS will exhibit a mean time to repair of not more than 30 minutes for any single maintenance action and will not require more than 90 minutes for any single repair action, including time required for fault localizing, repair, test, and restoration to service. The reliability requirements stated in the ETVS

specification are traceable to NAS-SR-1000, and will provide an availability of at least 0.99999, with any loss of a critical service (i.e., A/G or G/G communications) not exceeding 6 seconds. (Source: ETVS Specification, FAA-E-2894, July 26,1994, Appendix I).

3.2.3   Software Maintenance

AOS-510, Communications Support Engineering Branch is responsible for providing life cycle software maintenance support for the ETVS. (Source: ETVS ILSP, August 1998, paragraph 3.2.3)

3.2.4   Systems Operation/Monitoring

The Remote Monitoring Subsystem (RMS) is a P^3I. The RMS, when installed and connected to a government furnished Maintenance Processor Subsystem (MPS) and Maintenance Data Terminal (MDT), will enable the ETVS to become part of the government's Remote Maintenance Monitoring System (RMMS). The RMMS will collect maintenance related data (including status reports and alarms) from, and provide maintenance related commands to remote equipment. Other than the inclusion of a P^3I RMMS interface, no changes to system operation/ monitoring are anticipated.

3.2.5   System Certification

The ETVS will be fully consistent with the current system certification procedures for terminal Air Traffic Control (ATC) operations and maintenance. No changes to systems certification are anticipated. In the event requirements change, AOS-510 will make any updates to system certification procedures as necessary. (Source: ETVS ILSP, August 1998, paragraph 2.2)

3.2.6   Personnel Certification

The ETVS maintenance training and certification program is in accordance with FAA practice. Hardware Maintenance training for AF site technicians will be provided prior to system installation. Additional detail on AF personnel training and certification is given in section 8.3, Training.

3.3   Implementation Roles of Regional F&E Personnel

Region F&E personnel are needed to support implementation activities at ETVS sites during all seven phases of implementation. During the planning and site preparation phases, F&E personnel will provide engineering resources and plan, supervise/monitor site modifications required prior to ETVS installation. The contractor, Denro, is responsible for installing the ETVS, but F&E personnel are required to supervise the installation and conduct the Contract Acceptance Inspection (CAI). Regional F&E personnel will prepare and clear any Program Trouble Reports (PTRs). Denro is not contracted to remove the old voice switch equipment. Therefore, following Operational Readiness Date, F&E personnel are required for removal of the old equipment and cabling. An equipment removal plan for the replaced voice switch is being developed by AFR-302. The Disposal Plan will augment FAA Order 4800.2C, Utilization and Disposal of Excess and Surplus Property.

3.4   Implementation Roles of AF Operations Personnel

Airway Facility operations personnel will be responsible for providing an ETVS project coordinator, provide site survey support/input, select/designate Regional AF personnel for

participation in installation tasks, provide ETVS documentation for site reference, participate in site installation, participate in the Contract Acceptance Inspection (CAI) and Joint Acceptance Inspection (JAI). AF personnel will update personnel and equipment certification requirements to reflect ETVS equipment, and create, maintain and update ETVS Facility Reference Data File (FRDF) information. AF personnel will complete ETVS-related training and declare Initial Operating Capability (IOC) and Operational Readiness Date (ORD). AF personnel will approve equipment removal procedures developed by AF Facilities and Equipment personnel, commission the ETVS in coordination with Air Traffic personnel, and manage systems maintenance aspects of equipment removal.

3.5-3.19 (Reserved)

3.20   Status Assessment
On April 15, 1996 AND-320 sent, via memorandum, a Notification of the Planned ETVS Project Deployment to the Labor & Employee Relationship Functional Team, AHR-12. AHR-12 is expected to in turn notify the appropriate Union(s) and schedule briefings.

4.0   AT OPERATIONS

4.1   Summary of AT Operational Impacts

4.1.1   Transitory State

The replacement of obsolete voice switching equipment may include the interruption of communications functions at a limited number of operational positions during cutover. Interruption in service will be minimized and occur on a non-interfering basis. These interruptions will not affect the ability of the facility to provide reliable air-to-ground and ground-to-ground air traffic control services (see section 9 for details pertaining to on-site testing).

4.1.2   Operational State

 ETVS Core System - The ETVS will be fully consistent with current operational concepts of terminal ATC communications. The ETVS will duplicate the basic functions and features of current equipment, and will add enhancements in the form of new features for operators (i.e., controllers) and supervisors.

Pre-Planned Product Improvements – Changes to AT operations are anticipated if several of the ETVS Pre-Planned Product Improvement (P^3I) additions are implemented. The Advanced Terminal Information Service (ATIS) monitoring feature in the ETVS P^3I package will allow air traffic controllers and supervisors to listen to ATIS messages (verbal briefings on prevailing airport conditions to pilots via VHF radio) through a headset or loudspeaker as they are transmitted. The ETVS may also include a Management Information System (MIS) as a P^3I improvement. The MIS will automatically collect routine administrative and personnel data, reducing the workload of the air traffic supervisor. The Communications Traffic Data (CTD) and system event collection and reporting P^3I, if implemented, will provide an accurate summary of communications utilization data and information on position activity for use by air traffic supervisors. This data will aid in system incident investigation, resource allocation, and workload assessment. Specific AT procedural changes with regard to these possible future enhancements will be coordinated through the Air Traffic Systems Requirements Service, Communications/ Datalink Systems Division, ARN-200, with input from human resource personnel and union representatives, prior to implementation of the specific P^3I item.

4.2   AT Procedural Changes

4.2.1   ATC Operational and Management Procedures

The only change to AT operational and management procedures anticipated with the implementation of the ETVS will be a result of the Advanced Terminal Information Service (ATIS) monitoring feature in the ETVS P^3I package. This feature will allow air traffic controllers and supervisors to listen to ATIS messages through a headset or loudspeaker as they are transmitted. Specific AT procedural changes with regard to this enhancement will be coordinated through the Air Traffic Systems Requirements Service, Communications/ Datalink

Systems Division, ARN-200, prior to implementation of the ATIS P^{3}I package. No other changes to air traffic controller operational or management procedures are anticipated as a result of ETVS implementation.

4.2.2   Flight Procedures/Standards

The ETVS will be fully consistent with the current flight procedures and standards of terminal ATC communications. No impact on flight procedures or standards is antic ipated.

4.2.3   Administrative and Management Procedures

The implementation of Management Information System (MIS) and Communications Traffic Data (CTD) functions will improve administrative and management capabilities by providing accurate tracking of routine administrative and personnel data. The MIS feature will automate the collection of data on time-on-position and training and will greatly reduce the administrative workload of the air traffic supervisor. The CTD and system event collection and reporting P^{3}I will provide an accurate summary of communications utilization data required to make informed decisions regarding communications resource allocation, workload leveling, and system studies. Specific AT procedural changes with regard to these enhancements will be coordinated through the Air Traffic Systems Requirements Service, Communications/ Datalink Systems Division, ARN-200, prior to implementation of the MIS and CTD P^{3}I packages.

4.2.4   Software Verification Procedures

ETVS software verification procedures will be completed using the current AOS software verification procedures.

4.2.5   Inter-facility Procedures

The ETVS will be fully consistent with the current inter-facility procedures of terminal ATC communications and no impact on inter-facility procedures is anticipated.

4.2.6   Personnel Certification Procedures

The ETVS will be fully consistent with the current personnel certification procedures of terminal ATC communications. No changes to personnel certification procedures are anticipated.

4.2.7   System Backup/ Cutover Procedures

The ETVS will be fully consistent with the current system backup/ cutover procedures of terminal ATC communications. Individual regions determine system backup/ cutover procedures. The ETVS transition at each site will be a "hot cutover". There will not be a transition switch provided with the ETVS to allow for switching between the replaced voice switch and the ETVS. For the first site in each region, contractor system cutover support will be provided by AND-320. Additional contractor cutover support for special situations can be requested of AND-320.

The ANI organization has instituted a 'Lessons Learned Communications Network'. The ANI Terminal Manager, ANI-40, conducts biweekly telecons with representatives from each Implementation Center to discuss issues with the terminal facilities' automation and communications switching programs. These telecons are held at 2:00PM (Eastern Time) every

other Tuesday. In addition, AND-320 holds monthly telecons where the regions can discuss issues related to ETVS implementation and cutover.

4.3   AT Implementation

Regional Air Traffic personnel will be required to coordinate a Regional Priority list for ETVS sites with Air Traffic Systems Requirements Service, Communications/ Datalink Systems Division, ARN-200, ARN-200 will determine the priority of switch deliveries, while scheduling of deliveries will be coordinated between the program office and Regional Associate Program Managers. In addition, AT personnel will define AT operational requirements, determine new plans and procedures to be used after implementation, oversee the conduct of site surveys and preparation of site survey documentation, and participate in, or monitor, FAA operational testing at each site. All AT operations at the site and controller involvement in testing procedures will be coordinated through the AT manager prior to the start of testing. Please refer to table 9-6, Personnel Requirements to Support ETVS Testing, as well as section 9.4.1, Personnel Requirements, for more detail concerning AT involvement in FAA operational testing activities. Sections 13.2.2, Pre-Installation and Checkout Phase, 13.2.4, System Integration Phase, and 13.2.5, Field Shakedown Phase also contain information concerning the role and schedule of AT personnel in ETVS Implementation.

4.4-4.19   Reserved

4.20   Status Assessment

The baseline ETVS system meets the current requirements of the operational system. Risk is minimized by segregating the upgraded functionalities into P^3I packages. These can be developed as standalone upgrades and added individually to the baseline system as P^3I capabilities are developed by the contractor. AT community involvement will be essential during all phases of the procurement to continually keep user requirements at the forefront of the acquisition.

5.0   SYSTEM CONFIGURATION AND ENGINEERING

5.1   NAS Level Architecture

The ETVS will interface with government-furnished Air-to-Ground (A/G) communications equipment (fixed-frequency transmitters and receivers) via the local airport cable plant or remotely using government-furnished remote control equipment and telephone circuits. The ETVS will also interface with the existing interphone network, consisting largely of government-furnished point-to-point and multi-point dedicated lines, permitting operators to communicate with other ATC facilities. (ETVS Operational Requirements Document, 11/10/93, para. 2.1)

5.1.1   NAS Target State

The target state configuration depicted in NAS-SS-1000 is being updated to a new baseline, which will encompass new ETVS requirements. The newly baselined NAS-SS-1000 is not yet available; the NAS Change Proposal (NCP) proposed is still in process.

5.1.2   Inter-program Interfaces

The ETVS will interface with a number of other current FAA projects, including legal voice recorders, administrative telephone systems, and leased transmission channels. The ETVS is a wholly independent subsystem within the NAS environment, and can operate effectively without regard to the implementation of those projects.

5.1.2.1 Legal Voice Recorders

Multi channel legal voice recorders record all voice communications conducted between air traffic controllers and other ground based ATC facilities through a Ground-to-Ground (G/G) network and communications between air traffic controllers and pilots via Air-to-Ground (A/G) communications links. The FAA's existing complement of legal recording devices consists of multiple recorder systems, including the Digital Voice Recording System (DVRS), Multi-channel Voice Recorder (MCVRs) Systems and High Capacity Voice Recorder (HCVRs) Systems.

The DVRS is a voice recorder capable of being configured for as few as sixteen (16) channels and as large as four hundred and thirty two (432) channels; this upper limitation is a contractual limit and not one of hardware or software. The planned DVRS capability will provide higher reliability than is currently available with fielded systems and will provide a remote alarm capability for maintenance and support use. The DVRS will be the baseline voice recording system throughout the NAS by 2002, providing the capability to interface with all voice switching communication equipment.

The MCVRs are 10 and 20 channel recorders currently in use at approximately 260 Airport Traffic Control Tower (ATCT), Flight Service Station (FSS), and Automated Flight Service Station (AFSS) facilities.

The HCVR is a 60 channel voice recorder system, procured for installation at the Air Route Traffic Control Centers (ARTCCs), selected Terminal Radar Approach Control (TRACON)

facilities, and training/test facilities. The planned delivery and installation of the HCVRs is complete.

The Digital Voice Recorder System (DVRS) is intended as a replacement for aging and maintenance intensive analog recorders currently in use at FAA facilities.

The ETVS will provide connectivity to legal voice recorders for the recording of all air-to-ground and ground-to-ground communications and relief briefings at each operational position. Individual outputs for headset and loudspeaker recording reflecting relative volume levels will be provided at each position. (Source: ETVS Specification, 7/26/94, paragraph 40.2.2)

5.1.2.2 Operational Support Telephone System (OSTS)

The OSTS is a replacement for aging Administrative Telephone Systems (ATSs). The OSTS provides single-line, multi-line, speaker phone, and attendant stations in either of two configuration tiers - 8 line/16 station, or 24 line/64 station. (Source: OSTS Purchase Description, 3/31/93, C.3)

In the event that ETVS implementation displaces old voice switching equipment that contains the facility's Administrative Telephone System (ATS) as an integrated subsystem, an OSTS will be required to provide administrative telephone service to the site. AND-320 will fund for the OSTS in this event. The old voice switch backroom equipment will be used to provide interim ATS service until an OSTS can be installed at the site. Section 13.2.6, Dual Operations Phase, contains more details concerning use of the replaced voice switch as an interim ATS. (Source: ETVS Specification, 7/26/94, paragraph 40.2.1.7)

5.1.2.3 Automated Terminal Information Service (ATIS)

ATIS provides pre-recorded verbal briefings on prevailing airport conditions to pilots via a discreet radio frequency. Implementation of ATIS cross-connect and monitoring capability as a P^3I will allow controllers direct access to ATIS information given to pilots. Cross-connect refers to the connection of outgoing ATIS voice messages from ATIS recorders to specified VHF radio transmitters. Monitoring denotes the ability to listen to the ATIS messages via ETVS headset or loudspeaker as they are transmitted. The P^3I ATIS cross-connect will allow controllers to modify and listen to ATIS messages prior to broadcasting them over a radio transmitter. (Source: ETVS Specification, 7/26/94, paragraph 100.1)

5.1.2.4 Remote Maintenance Monitoring System (RMMS)

The RMMS provides a system to automate FAA maintenance operations. It provides monitoring and control equipment for most FAA facilities so that equipment performance monitoring, control, and certification can be accomplished from centralized work centers. (Source: Capital Improvement Plan, 3/94, 2-6-1)

The ETVS may be equipped with a Remote Monitoring Subsystem (RMS) as a P^3I. The RMS will allow for connection to a government-furnished Maintenance Processor Subsystem (MPS) and Maintenance Data Terminal (MDT). The RMS, MPS, and MDT are all considered part of the RMMS. The RMS will issue alarm messages to the MPS upon detection of critical failures (i.e., failures that interrupt A/G or G/G communications), alert messages upon detection of non-

critical failures, and return to normal messages for all alarm or alert conditions that have been cleared. (Source: ETVS Specification, 7/26/94, paragraphs 130.1, 130.2.1.2)

5.1.2.5 Leased Inter-facility NAS Communications System (LINCS)
LINCS is a project that allows the FAA to lease transmission channels for both analog and digital communications. LINCS transmission systems include Metropolitan Area Networks (MetroNets), which provide channels in the general vicinity of large metropolitan areas, Intra-LATAn (Local Access and Transport Area) Networks (IntraNets), which provide channels within LATAs, and Inter-LATA Networks (InterNets), which provide channels between LATAs within the contiguous United States. (Source: Functional Specification for LINCS, 3/15/90, para 1.1)

5.2   Platform Architecture
The ETVS will be installed and used as part of the terminal platform in two environments including ATCT cabs, and Terminal Radar Approach Control (TRACON) facilities.

Airport Traffic Control Tower (ATCT) cab. The ATCT cab is used for the control of air traffic within visual range of the airport (including ground traffic). The ATCT cab is generally located at the top of a tower that can be 125 feet high or more, and generally has fewer than ten positions. Some ATCT cabs incorporate approach control positions and may require more ETVS position equipment for this function.

Terminal Radar Approach Control (TRACON) facility. The TRACON is used for the control of aircraft on approach or departure within radar range of the airport. TRACONs are typically located immediately below an ATCT cab in darkened rooms, which facilitates visibility of the radar displays. Some of the larger TRACONs will require the largest of the ETVS system types (Basic System (BS) -4). These systems have the capability to provide voice communications services for up to 80 controller positions.

5.2.1   Interim Platform Configuration

Interim platform configuration will involve the ETVS being used in the ATCT cabs and TRACON control rooms as described above. It is possible, at previously operational sites, that the voice switch being replaced will be retained for use as an Administrative Telephone System (ATS). Some current voice switches incorporate the ATS as an integral part of the backroom equipment. This backroom equipment will be retained until a replacement ATS, an Operational Support Telephone System (OSTS) (see section 5.1.2.2), can be delivered and installed. Please refer to section 13.2.6, Dual Operation Phase, for more details.

5.2.2   Target State Configuration

The NAS target state configuration will incorporate the ETVS into the terminal environment. The ETVS will be installed and operated in ATCTs and TRACONs as described in section 5.2 .

5.3   Subsystem Level Architecture

ETVS systems will be modular and will be installed fully wired for the maximum number of positions within a size group (refer to Table 5-1, System Floor Space Allocation, for basic

system configurations and sizes). The ETVS will interface with government-furnished air-ground communications equipment, either locally or remotely. The ETVS will also interface with the existing interphone network, consisting largely of government-furnished point-to-point and multipoint dedicated lines using a variety of signaling and supervision techniques, permitting operators to communicate with other ATC facilities. The ETVS will interface with external telephone networks such as facility Private Automated Branch Exchange (PABX), Public Switched Telephone Network (PSTN), Federal Telecommunications System (FTS), and others, permitting operators to communicate with outside organizations and individuals. A P^3I upgrade, if implemented, will provide direct interface to a variety of digital voice communications circuits, such as T-1 carriers and the Integrated Services Digital Network (ISDN), to replicate current interphone and external network communications functions wherever transition from analog to digital is practical and cost-effective.

5.3.1   Hardware

5.3.1.1 Position Equipment

Operational positions will be provided for air traffic controllers and specialists. These operational positions will provide A/G and G/G communications capability using direct and indirect access selectors, A/G frequency control displays, headset jack modules and volume and sidetone controls, position loudspeakers, footswitches, facility entry door releases, and legal voice recording. The position equipment will be sized to fit in both tower and TRACON consoles. (Source: ETVS Specification, 7/26/94, para 10.2)

Workstations vs. Positions. Supervisory and Maintenance Configuration Terminals (SCTs and MCTs respectively) differ from supervisory and maintenance *positions*. The SCTs and MCTs are personal computers that provide access to the various supervisory and maintenance functions, such as mission reconfiguration and fault isolation. The supervisory and maintenance *positions* are basically operator positions for use by supervisory and maintenance personnel in performing supervisory and maintenance tasks, such as monitoring controllers, or communicating with other supervisors or other facilities.

Workstation Access. Workstations connect supervisory and maintenance personnel to the system database, providing the means to reallocate system communications assets. Access to reconfiguration functions is controlled through the use of multi-level passwords. Workstation functionality is password defined. Maintenance personnel with the correct password can walk up to a "supervisory workstation" and access maintenance functions, and vice versa. Supervisory personnel will have passwords that let them accomplish supervisory functions. Maintenance personnel will have passwords that allow them to accomplish maintenance functions. The passwords are set up by a "superuser", usually the head AT and head AF personnel at a facility. The superuser defines the passwords and access restrictions for all other users of the system. (Source: ETVS Technical Data Package, DRAFT, March 18, 1996.)

5.3.1.2 Supervisory Workstation

The supervisory workstation will be used to initiate and edit configuration maps, access MIS and CTD information (if these P^3I upgrades are implemented), and obtain operational status information. The supervisory workstation consists of a stand alone device, such as a personal

computer, monitor, keyboard, mouse, and printer. (Source: ETVS Specification, 7/26/94, para 10.2.2)

5.3.1.3 Maintenance Workstation

The ETVS maintenance workstation may be used by maintenance personnel to initiate and edit configuration maps, add new system capabilities, detect and localize system faults, monitor position equipment and external lines, and to test and repair the system. One maintenance workstation comes with the system, and up to 5 additional "remote maintenance terminals" can be ordered if required. (Source: ETVS Specification, 7/26/94, paragraph 10.2.3)

5.3.1.4 Reserve Power System

The ETVS reserve power system provides at least 20 minutes of power reserve in the event of power failure and also provides conditioning of the government furnished power . The reserve power system allows graceful termination of ATC operation in the event of a long term power failure and a temporary bridge for temporary failures and "brownouts". (Source: ETVS Specification, 7/26/94, paragraph 50.2.3)

5.3.1.5 Supervisory Recording

The ETVS offers the capability for supervisors to make informal and impromptu voice recordings of position communications for the purpose of evaluating controller performance. Supervisory recordings are made using a special supervisory record jackbox and standard off-the-shelf cassette recorders. (Source: ETVS Specification, 7/26/94, paragraph 10.3.6.1)

5.3.2   Software

The ETVS Specification is a system level document and does not differentiate between the utilization of hardware or software to meet functional requirements. As an NDI procurement, embedded ETVS firmware will not be maintained by the FAA. The Communications Support Engineering Branch, AOS-510, will provide lifecycle software maintenance support for ETVS.

5.3.3   Physical Specification

Central equipment room racks measure 21 inches wide by 30.75 inches deep (outside dimensions). A minimum of 24 inches of access space is required both in front and behind ETVS backroom equipment racks.

An average central equipment room rack weighs about 600 lbs. fully loaded. Weight varies depending on what components the rack contains. Racks containing power sub-system components (one per ETVS) will weigh about 675 lbs. Racks with standard rack equipment will weigh about 575 lbs. Average weight per square foot for racks is defined in table. Average includes weight distributed over area covered by ETVS racks (including 21" front and back access space).

Supervisory/Maintenance Position Equipment Supervisory and maintenance positions consist of position equipment (type 1 or 2) and a supervisory or maintenance position terminal. The terminal is a standard PC, i.e., IBM compatible 486 (minimum) personnel computer with a 15" monitor.
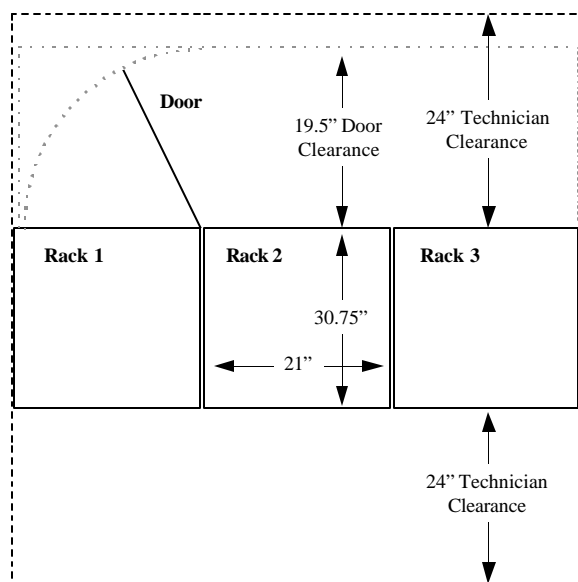
Figure 5-1: Typical Floor Plan with Recommended Clearances (BS-2)

ETVS Central Equipment Rack Floor Space Requirements					
System Class	Max Floor Space per ETVS Spec (in)	# of Cabinet Frames	Required Floor Space		Total Required Floor Space (ft.^{2})
			Width (in)	Depth (in)	
BS-1	72 x 48	2	42	78.75	23.0
BS-2	96 x 96	3	63	78.75	34.4
BS-3	96 x 144	4	84	78.75	45.9
BS-4	144 x 156	7	147	78.75*	80.4

Table 5-1: System Floor Space Requirements

ETVS Central Equipment Rack Weight			
System Class	# of Cabinet Frames	Total Weight of all racks (lbs.)	Average Weight Distribution (lbs/ft^2.)
BS-1	2	807	90
BS-2	3	1278	95
BS-3	4	2073	116
BS-4	7	3491	111

Table 5-2: System Weights

Panel Cutout Area required for Type 1 Position Panels			
Module	Qty	Height (in.)	Width (in.)
Hard Key Basic Operator Position (BOP)	1	4.59	11.12
Hard Key Mini BOP	1	6.67	7.95
4 Key Programmable DA Module	1	4.59	3.90
4x5 (20 Button) DA Module	1	4.59	5.37

7x5 (35 Button) DA Module	1	4.59	7.95
IA Display Module	1	4.59	4.22
Split IA Display Module	1	4.59	4.22
Speaker Module	1	4.59	4.22
Radio Frequency Selector Module	4	4.59	8.26
Jackbox Module	1	1.04	6.04

Table 5-3: Basic Type 1 position panel cutout space (key and lamp for Tower Cab or TRACON)

Panel Cutout Area required for Type 2 Position Panels			
Module	Qty	Height (in.)	Width (in.)
TRACON TED	1	7.95	7.95
Tower TED	1	8.12	10.89
TED Control Module	1	4.59	4.22
Split TED Control Module	1	4.59	4.22
Speaker Module	1	4.59	4.22
Jackbox Module	1	1.04	6.04

Table 5-4: Basic Type 2 position panel cutout space (touch screen for Tower Cab or TRACON)

Remote Position(s). Remote Position(s) will require Government Furnished Equipment (GFE) cabling (refer to cabling section for specifications on required cabling). Cutout sizes will be the same as for the Type 1 and Type 2 position equipment. Remote power will be provided by Denro.

Elevation drawings showing size and position of all equipment to be installed will be provided by contractor in Site Installation, Integration, and Acceptance Test Document (SIIATD). Drawings will also identify any existing equipment that needs to be moved.(Source: ETVS Technical Data Package, 12/8/95,p.17-19)

5.4-5.19 (Reserved)

5.20   Status Assessment

There are on-going Regional visits to address any facility space allocation issues for the ETVS. No known system specifications exist that have not been provided to the field for review and comment.

6.0 PHYSICAL FACILITIES

6.1 Real Estate

6.1.1 Real Estate Requirements

The ETVS will be located inside the tower or TRACON facility. Additional purchase or leasing of real estate is not anticipated.

6.1.2 Real Estate Plans

No real estate plans have been made to date.

6.2 Heating, Ventilation, and Air Conditioning (HVAC)

6.2.1 HVAC Requirements

ETVS operational temperature range is from 10 to 40°C, with a relative humidity of 10 to 80% non-condensing.

The worst case power dissipation data supplied below considers current load to all units in the racks and position loads using Tower Touch Entry Display (TED) type positions (90 W per position). This method provides a slightly higher than nominal power distribution for calculating the power dissipation of the power supplies based on 80% efficiency. The power for each Basic System is as follows:

Basic System	Total DC Power (W)	Power to Racks (W)	Power to Positions (W)
BS-1	1,272	462	810
BS-2	1,920	480	1,440
BS-3	4,032	432	3,600
BS-4	8,640	1,440	13,500

Table 6-1: Basic System Power Requirements

A more comprehensive discussion of HVAC requirements and heat load estimation can be found in the latest revision of the ETVS Technical Data Package, which is published by AND-320.

6.2.2 HVAC Plans

The ATCT cabs and TRACONs where the ETVS will be deployed are already temperature and humidity controlled environments. Modifications to existing cooling capability could be required based on the additional heating loads generated by the ETVS equipment

6.3 Cables

6.3.1 Cable Routing/Raised Floor Requirements

The site should label all interface, telecommunications, and power cables designated for connection to the ETVS. Cabling routing plans will be contained in the Site Implementation

Plan Site Installation, Integration, and Acceptance Test Document (SIIATD), CDRL E02a, generated for each site. Cables will be provided by Denro to connect from the government distribution frames to the ETVS, and from the ETVS Primary Power Panel to the ETVS power distribution block. The site will be responsible for bringing all door release cables to the ETVS racks, as the door release interfaces do not go to the Government demarcation point. Cable access will be required between ETVS backroom equipment and:

- Position equipment;
- Supervisory workstations;
- Maintenance workstations;
- Facility power (critical/essential for ETVS and standard commercial 120 Vac for convenience outlets);
- Legal recorder interface;
- Government interface distribution frame; and,
- Interfaces not located at government distribution frame.

Site specific cabling requirements will be determined at the time of the site survey.
All interconnection cables and connectors required for factory testing site installation, checkout, acceptance testing, cutover, operation, and maintenance will be compatible with both under floor and overhead distribution and cable facilities provided by the government. Cabling and wiring will comply with 3.3.1.3.4.26 of FAA-G-2100; National Electric Code, NFPA-70; and FAA-C-1217. All interconnecting cables will be plenum-rated in accordance with NFPA-70 725-38 and 800-53, for cabling in raceways.

All cable connectors furnished on the equipment for making external connections will be clearly identified on the plug-in side by labels descriptive of their specific function and by the proper reference designation. Cable connectors will be mechanically keyed to prevent incorrect installation and hookup. The mating connector part (connector or plug) that is electrically energized will contain female contacts. All cable connectors will be mechanically retained in place.

Signal cable end terminations will be solderless, quick-disconnect terminal blocks or mass termination connectors. Connectors that have insert-type contacts may be loaded with only the contacts actually used plus spares. Power cable terminations will be screw-type terminal blocks, pressure contact terminal blocks, or connectors.

All Alternating Current (AC) power cables and wiring within the ETVS shall be isolated from sensitive voice and signaling circuits. Cabling shall include all junction boxes, fittings, and distribution equipment (switches and circuit breakers from FAA power source to the ETVS primary power panel).

6.3.2   Cable Plans
Site specific cabling plans will be developed after the site survey. Cabling plans will be referenced in future revisions of the PIP, and documented in each site specific Site Implementation Plan and the contractor-developed Site Installation, Integration, and Acceptance Test Document (SIIATD), CDRL E02.

6.4   Power

6.4.1   Power Requirements

Powers supplies derive +24 Vdc from FAA furnished ac, (208 Vac, 47-63 Hz, single phase). Redundant load sharing 24 Vdc rectifiers supply power to the switching and operator position equipment. The number of power supplies was determined by calculating system current requirements, comparing to power supply capacity, and adding an additional supply for redundancy. In the event of a power supply failure, the redundant supply supports the load. In addition to supplying the system current load, the rectifiers also charge the Gel-Cell batteries connected to the system +24 Vdc bus.

The battery backup will supply system power for a minimum of 20 minutes of full system operation if there is a power supply failure. The battery backup power is connected to the system through a DC Disconnect Unit. This unit allows the batteries to be charged by the power supplies when the voltage is above 26 Vdc. The Disconnect Unit keeps the batteries connected to the load when the power supply output fails, and cuts off the battery power to the system if the battery voltage drops below a predetermined minimum voltage threshold.

6.4.2   Power Plans

Critical or Essential power must be available at the site to power the ETVS backroom equipment. If the ETVS is placed on the facility Critical Power bus, the site is responsible for preparing a local Power NCP. The ETVS backroom equipment will provide power for non-remote positions. Power for the maintenance and supervisory terminal(s) will be provided from the location of the terminals as described below. ETVS backroom equipment will require a single phase 208 Vac (+/- 10%), 47-63 Hz circuit for each power supply contained in the ETVS backroom equipment racks. Each circuit will require a 30 Amp single throw, double pole, motor-rated circuit breaker. The number of circuits is dependent upon Basic System size of the switch to be installed at the site and is defined in the table below. If the facility only has 208 Vac, 3-phase power, two of the three legs can be pulled off to provide 240 Vac single-phase power. ETVS facility maximum power requirements are depicted in table 6-2 below. These maximums were calculated based on a fully loaded Basic System with the assumption that power supplies have an efficiency of 80% (actual: power factor is 0.98; efficiency is 86%). The AC Amp requirements will be distributed between all power supplies, and thus all required circuits, for each ETVS Basic System.

BS Class	Power Supplies (125 Amp)	AC Amps @ 220V	Max Power Consumption	
			Facility Side (kVA)	Switch Side (DC - Watts)
BS-1	2	7.23	1.59	1,272
BS-2	2	10.91	2.4	1,920
BS-3	3	22.91	5.04	4,032
BS-4	4	49.91	10.8	8,640

Table 6-2: ETVS Power Requirements

Power Runs will be determined on a site-by-site basis. Exact distances from central equipment to power sources will be contained in the Site Installation, Integration, and Acceptance Test

Document (SIIATD - E02A). The maximum distance from the power panel to the equipment rack power inputs is limited only by the tolerances of operation for the power rectifiers (see above). The distance becomes a factor when the length of the power cable distorts the source voltage beyond the stated tolerances in the ETVS Specification. It is recommended that the backroom racks be located as close as possible to the power panel.

The backroom equipment racks contain multiple components, including power supplies, reserve power, a maintenance position, and duplex convenience outlets

6.5   Physical Safety and Security

6.5.1   Security and Safety Requirements

The ETVS should not present any physical dangers to position operators or maintenance personnel. System safety engineering principles will apply in accordance with 3.3.6 of FAA-G-2100F.

6.5.2   Security and Safety Plans and Procedures

Specific requirements for safety cited in the ETVS specification include a prohibition against sharp edges, use of shatterproof glass, overheat warning devices on each equipment room cabinet, and the use of flame resistant materials.

6.6   Environmental/HAZMAT

6.6.1   Environmental Monitoring Requirements

The ETVS will pose no environmental hazards (toxic materials or gasses) to position operators or maintenance personnel.

Some facilities may contain hazardous materials (HAZMAT) that may be disturbed during site preparation or installation. For example, in order to route cabling for the new system, it may be necessary to drill holes in floor tiles containing asbestos. Installation may require displacing chemical batteries that are contained in power supply systems for other equipment at the facility. HAZMAT items will be identified during the site survey.

6.6.2   Environmental Monitoring Plans and Procedures

The ETVS will be constructed of low toxicity materials that will not emit dangerous gasses due to fires or toxic conditions when used according to the environmental operating conditions described in the ETVS Specification. The reserve power system shall not vent hazardous gasses.

Hazardous materials will be identified during the site survey by regional Facilities and Equipment (F&E) personnel (ANI-X40). A HAZMAT mitigation plan will be developed by regional F&E personnel which identifies procedures for handling and disposing of any hazardous materials associated with the ETVS Project. Such activities will be funded as part of site preparation activities by the program office (Source: section 7.1.2.1, Site Preparation Funding).

6.7   Grounding, Bonding, Shielding, and Lightning Protection

6.7.1   Grounding, Bonding, Shielding, and Lightning Protection Requirements

The ETVS will require access to both single-point and multi-point ground systems. These ground systems will be installed as part of site preparation activities. A power ground (green wire ground) will be required at the location of the backroom equipment, and at any remote locations where position equipment is being powered by remote power supplies. This ground will connect to the power panel from which the ETVS is getting its power. Access to a single-point ground plate will be required to ground high frequency signals, including radios, and digital circuitry. The single-point ground plate should be within 20 feet of the ETVS central racks. A multi-point ground plate will also be required for chassis ground within 30 feet of the ETVS racks.

Access to multi-point ground plates will be required in all areas where position equipment is installed to provide for chassis ground. These multi-point ground plates should be within 30 feet of any ETVS position equipment.

6.7.2   Grounding, Bonding, Shielding, and Lightning Protection Plans

The government will provide the single-point earth ground for AC power ground at all installations. The ETVS will ground all AC components to a common ground derived from the AC power system. The ETVS will also provide separate chassis, signal and communications trunk circuit grounding. The ETVS will be shielded against high voltage damage due to lightning surges, and will provide secondary lightning surge protection of telephone circuits interfacing with external transmission facilities in accordance with FAA-STD-019 and FAA-STD-020.

6.8   Space

6.8.1   Space Requirements

ETVS system space requirements have been addressed in section 5.3.3, Table 5-1 provides floor space parameters

6.8.2   Space Allocation Plans

All ETVS rack equipment will be located in the facility communications equipment room (or other designated area) and outside of the ATC operation areas. ETVS equipment that may be placed in ATC operation areas include:
- Position equipment;
- SCT(s);
- Supervisory Record Jackbox(es);
- Remote Alarm Units;
- Remote Maintenance Terminals; and,
- Remote Power Racks.

The contractor will provide site-specific elevation drawings following the site survey. These drawings will show the location of all ETVS position equipment, supervisory and maintenance

workstations, and back-room equipment. These drawings will be provided as part of the site survey and the site-specific Site Installation, Integration, and Acceptance Test Document (SIIATD), CDRL E02a. The SIIATD will also specify all modifications to FAA equipment required during installation. Drawings will be provided detailing the distance existing equipment will be moved and the location of any new equipment.

6.9   Construction and Modification

6.9.1   Construction and Modification Requirements

Aside from possible cable routing alternations or equipment anchoring, no modification to facilities are expected for the installation of the ETVS.

6.9.2   Construction and Modification Plans

Cable routing and possible facility modification will be addressed on a site specific basis after the completion of the site survey. Any required construction or building modifications will be identified in the site-specific appendix to the Site Installation, Integration, and Acceptance Test Document (SIIATD), CDRL E02. Funding for construction or modification materials required for site preparation will be provided to the regions by the program office, AND-320. Labor charges associated with construction during site preparation will be funded by the regions (refer to section 7.1.2.1, Site Preparation Funding).

6.10   Telecommunications

6.10.1 Telecommunications Requirements

The ETVS will require access to G/G and A/G interfaces at a government distribution frame to establish communications capabilities offered by the voice switch.

6.10.2 Telecommunications Plans and Procedures

The ETVS contractor will provide cables to interconnect the ETVS to the government distribution frames. Specific interface types, descriptions, and cable pin-outs are identified in the ETVS Technical Data Package.

6.11-6.19 Reserved

6.20   Status Assessment

The ETVS size and environmental control requirements were based on FAA facility capacities. Some facilities' Lightning Protection, Grounding, and Bonding systems may not meet requirements of FAA STD-019B. Deployments to these facilities may have to be re-scheduled in the waterfall until after the regions are able to plan, fund, and execute this work.

7.0   FINANCIAL RESOURCES

7.1   Summary of Funding Plan

Replacement voice switching equipment and some site preparation work will be funded under the AND-320s Facilities and Equipment (F&E) budget. In addition, contractor site maintenance support (to cover the time between system acceptance and availability of training for FAA Regional AF maintenance technicians) will be funded using F&E money. Operations and Maintenance (O&M) funds will be used for follow-on logistics support.

The ETVS project receives facilities and equipment funding from three main sources. The replacement of voice switching systems in existing towers is funded by AND-320, Voice Switching and Recording Program, while the provision of voice switching systems for new, modernized, or relocated towers is funded by ANS-200, Facility Programs and Transition Division.   AND-320, Voice Switching and Recording, will be the line manager for these items. All of these programs have designated funding for specific sites. Sites requiring ETVS that do not appear on this list will have to be coordinated for inclusion with Air Traffic Systems Requirements Service, Communications/ Datalink Systems Division, ARN-200, and source of funds identified. Appendix C, Site Deployment Schedule, lists the proposed ETVS sites.

Funds for site preparation activities, within the AND-320 funded sites, will come from the program office, AND-320. A Project Authorization (PA) will go out to the region one year prior to installation. Levels of site preparation funding will be determined by AND 320 based on the average level of site preparation required.

7.1.1   Vendor Funding

Funds provided to the ETVS vendor by AND-320 will be used for the following:
- ETVS equipment;
- Turnkey installation (excluding site preparation);
- Site level and depot level spares kits;
- Special tools and test equipment;
- Technical documentation for training, operation, and maintenance;
- Onsite training of government personnel (operators and maintainers), if required;
- Onsite and telephone support for FAA site level maintenance, during the warranty period;
- Project management;
    - Configuration management;
    - Participation in system review, technical interchange meetings, logistics conferences, and other meetings; and,
    - Factory and site testing.

7.1.2   Regional Funding

Funds provided to regional offices by AND-320 will be used for materials required during site preparation, including such items as consoles, ground plates, and demarcation racks, etc. The

regions must program any additional funding required under activity 5 for labor and travel costs associated with site preparation. See section 13.2.2.2.1, Financial Resources, for further details.

7.1.2.1 Site Preparation Funding

AND-320 will fund all materials and parts for site preparation. AND-320 will issue project authorizations (PA) for small dollar amounts up to one year prior to installation to establish a job order number to which regions may then allocate F&E engineering resources. Regions may increase or decrease individual site funding levels according to specific site requirements. Should regional funding be exhausted, additional funding for site preparation materials and equipment will require regions to submit detailed site-specific cost estimates to AND-320 for review. Note that site preparation funds provided by AND-320 are to be used for materials only, and not for labor. Site preparation funding is intended to cover costs of materials for items listed in table 7-1, Intended Uses for Site Preparation Funding.

Materials Covered by ETVS Site Preparation Funding	
Tower Console Tops	Junctions Boxes
TRACON Console Panels	Jack Panels
Government Intermediate Distribution Frame	Single and Multipoint Ground Plates
Distribution Frame 66 or 110 Blocks	Ground Cables (from ground system to ground plates)
Power Cable Conduit	Drafting Costs (non-labor)
Cable Trays	One-time Electrician Cost
Circuit Breakers	Asbestos Tile Removal (under racks)
Power Distribution Panel(s)	Seismic Mounting Hardware

Table 7-1: Intended Uses for Site Preparation Funding

The program office does not intend for site preparation funds be used for labor costs, grounding upgrades to facilities (e.g., ground plane installation, counterpoise), cab modernization costs (e.g., painting, carpeting, patching/grouting, air conditioning), or Telecommunications Management and Operations (TM&O) costs (e.g., circuit re-termination, leased voice switch removal).

ETVS site prep funding levels will be provided to the regions as indicated below:

- BS-1 $15,000
- BS-2 $20,000
- BS-3 $25,000
- BS-4 $30,000

The above funding were developed using regional and headquarters data. The funds will be sent on a site by site basis.

7.1.2.2 Regional Test and Evaluation Funding

AND-320 will provide funding to the regions to cover travel and per diem expenses during Operational Test and Evaluation (OT&E)/Integration and OT&E/Operational testing on the first ETVS system at the FAA Technical Center for regional Facilities and Equipment (F&E) (ANI-X40), Regional AF Maintenance (AXX-4XX), Air Traffic (AT) (AXX-5XX) personnel, as well

as the Regional Associate Program Manager (RAPM) (ANI-X40). The regions will fund all other travel and per diem expenses for regional participation in test and evaluation activities.

7.1.3   AOS-510 funding

Funds provided to AOS-510, Communications Support Engineering Branch, by AND-320 will be used to cover travel and per diem expenses for the following activities:

- Operational Test and Evaluation (OT&E)/Integration and OT&E/Operational testing of the first ETVS system at the FAA Technical Center.
- OT&E/Integration or OT&E/Operational testing required at subsequent sites.
- Site Acceptance Testing and OT&E/Shakedown testing at the first ETVS site.
- Field Shakedown testing at subsequent sites.

7.1.4   ACT-340 Funding

Funds provided to ACT-340, Voice Switch Automation Division, by AND-320 will be used for contractor support of the AND-320 projects and to cover travel and per diem expenses for the following test activities:

- OT&E/Integration or OT&E/Operational testing required at subsequent ETVS sites.
- Site Acceptance Testing and OT&E/Shakedown testing at the first ETVS site.
- Site Acceptance Testing and Field Shakedown testing at subsequent sites.

7.1.5   Replaced Switch Funding

AOP-500 will fund those switches identified under the "Vintage Voice Switch Program". Non-Vintage-type switch removal funding issues are currently under consideration.

7.2   Facilities and Equipment (F&E) Budget

7.2.1   F&E Budget Requirements

F&E budget requirements for Fiscal Year 1999 includes funds for the regions for ETVS and funds for several systems. The 1999 budget is currently under consideration by the congress.

7.2.2   Summary of F&E Funding Status

F&E funding levels were drastically reduced in FY98. Detailed information about ETVS funding can be obtained from AND-320.

7.3   Operations and Maintenance (O&M) Budget

FAA performed site maintenance for the ETVS will be funded using OPS dollars allocated to the regions for site maintenance activities. The FAALC will provide depot repair services for the life cycle of the ETVS and will budget for the depot repair activity.

7.3.1   O&M Budget Requirements

ARN-200 will provide detail information concerning the O&M budget requirements. The O&M budget requirements include a budget for depot maintenance and for stock replenishment of consumables and LRUs. Other budget requirements will be identified prior to ETVS implementation.

7.3.2   Summary of O&M Funding Status

O&M budget funding requirements are an AF responsibility and will be coordinated with AND-320.

7.4   Research, Engineering, and Development (RE&D) Budget

7.4.1   RE&D Budget Requirements

No budgeting is necessary since the ETVS project is intended as an NDI procurement.

7.4.2   Summary of RE&D Funding Status

This section is not applicable to this document.

7.5   Administrative Phone System

In the event that a facility's administrative phone system is removed as a result of the replacement of the voice switch, an OSTS can be provided using AND-320 funding. The requirement for an OSTS should be identified during the ETVS contractor's site survey.

7.6-7.19 Reserved

7.20   Status Assessment

ETVS funding for FY99 is expected at or near the requested levels.

8.0   HUMAN RESOURCES

8.1   Human Resource Management

8.1.1   Impacts of Acquisition on Human Resource Management

8.1.1.1 Personnel Security

No impacts on FAA personnel security are anticipated. Contractors will be required to adhere to all security policies and procedures when entering and working in FAA facilities. Detailed personnel security requirements and procedures are identified in the contractor's Site Installation, Integration, and Acceptance Test Document (SIIATD). The SIIATD is currently a Draft document and under review.

8.1.1.2 Relations with Local Communities

The implementation of the ETVS is not anticipated to affect relations with the local community.

8.1.1.3 Relations with Aviation Community

The implementation of the ETVS is not anticipated to affect relations with the aviation community.

8.1.1.4 Employee Work Environment

It is anticipated that the employee work environment will improve with implementation of the ETVS. The core and P^3I upgrades are intended to make work easier for government personnel. These features will give managers easy access to valuable information concerning controller workload and will allow a better distribution of resources in meeting air traffic control needs.

8.1.1.5 Employee Job Satisfaction

Elements of the ETVS, including an improved Computer-Human Interface (CHI) and other new features, are anticipated to increase employee job satisfaction.

8.1.1.6 Labor-Management Relations

No impacts on labor-management relations are anticipated. The capability to make informal recordings of controller communications should not impact labor-management relations. Air Traffic supervisors currently use tapes from the legal voice recorders to assess controller performance. The presence of the supervisory recording feature will only expedite the process. Labor relations activities have included briefings conducted with NATCA and PASS officials.

8.1.1.7 Organizational Structure(s)

No impacts on FAA organizational structures are anticipated as a result of ETVS implementation.

8.1.2   Human Resource Implementation Strategies

All currently identified potential impacts of ETVS acquisition on human resource management are positive and are expected to benefit FAA employees.

8.1.3 Security Clearances

Security Clearances will not be required for installation team members. Access to the facility will be required. The Technical Onsite Representative (TOR) will be responsible for providing badging and briefings for installation personnel during site installation and evaluation visits. Contractors will be required to adhere to all security policies and procedures when entering and working in FAA facilities. Detailed personnel security requirements and procedures are identified in the contractor's Site Installation, Integration, and Acceptance Test Document (SIIATD).

8.2 Workload Impacts

8.2.1 Operational Workload Impacts

8.2.1.1 Air Traffic (AT)

No increase in AT operational workload is expected as a result of ETVS implementation. Possible installation of pre-planned product improvements, such as Communication Traffic Data (CTD) and Management Information Systems (MIS), will decrease AT supervisor workload.

8.2.1.2 Airway Facilities (AF)

AF operational workload will be affected in the FAA Logistics Center, Communications Support Engineering Branch, and Regional AF Maintenance. Descriptions of the changes to workload in these organizations are given below.

The FAALC will manage the ETVS depot level maintenance program. FAALC will chair a provisioning conference to identify the line replaceable units (LRUs) that will be stocked at the FAALC to support the ETVS sites. AML-200 is developing a site sparing plan/model to identify the site spares that will be delivered with each site's ETVS equipment. The Provisioning Conference is scheduled for August 27-28, 1998.

Communications Support Engineering Branch, AOS-510, a tenant organization at the FAA Aeronautical Center, will provide second level engineering support. AOS-510 provides second level support for the existing voice switch equipment, so little impact is expected to their workload.

Site level maintenance will be accomplished by FAA electronic technicians. The existing voice switch equipment that ETVS is replacing is contractor maintained. Maintenance staffing levels, as derived by the Workforce Standards Analysis Branch, AFZ-200, in accordance with FAA Order 1380.40C and FAA Order 1375.4B are presented in table 8-1, Direct Work Staffing Requirements for FAA Site Maintenance. . Previous AF workload data is un-quantifiable, and assumed to be minimal.

8.2.2 Implementation Workload Impacts

Facility Code	Class	Number of Switching Positions	System Specialist Staff Years		
			Recurring	Non-Recurring	Total
48HB	B	5-8	0.036	0.179	0.215
48HB	C	9-12	0.038	0.179	0.217
48HB	D	13-18	0.040	0.179	0.219
48HB	E	19-24	0.042	0.179	0.221
48HB	F	25-30	0.044	0.179	0.223
48HB	G	31-35	0.046	0.179	0.225
48HB	H	36-40	0.048	0.179	0.227
48HB	J	41-45	0.050	0.179	0.229
48HB	K	46-50	0.052	0.179	0.231
48HB	L	51-55	0.054	0.179	0.233
48HB	M	56-60	0.056	0.179	0.235
48HB	N	61-65	0.058	0.179	0.237
48HB	P	66-75	0.061	0.179	0.240
48HB	Q	76-100	0.073	0.179	0.252
48HB	R	101-125	0.079	0.179	0.258
48HB	S	126-160	0.084	0.179	0.263

Table 8-1: Direct Work Staffing Requirements for FAA Site Maintenance

(Source: ETVS ILSP, 8/98, Table 7.0-1)

8.2.2   Implementation Workload Impacts

Implementation workload impacts are identified in the ETVS GSIP and the current ETVS
Resource Tracking Program (RTP) Generic Network. The ETVS GSIP is Appendix A of this
PIP. The RTP project reference numbers are 60511 and 60515. Table 8-2 lists the
implementation workload impact derived from the RTP.

Site Implementation Phase	Activity Description	RTP Act. Ref. #	Activity Duration	Total Staff Days	# of Personnel Req RTP Personnel Category				
					Cat. RAPM	Cat. COME	Cat. CIVE	Cat. COMT	Cat. DRFD
Planning	Site Survey, etc	0-01700	60	-	25	60	-	-	-
Site preparation	Facility Modification	02500	120	-	5	60	150	10	30
Inco	Equipment Installation	04600	21	-	-	21	21	21	14
Integration	OT&E / CAI	04800	7	-	2	7	7	7	-
Dual Operations	N/A		N/A	-	-	-	-	-	-
Shakedown	JAI / ORD	08000	30	-	5	5	30	30	30
Equip. Removal		08800		-	39	153	218	78	74
Total staff days									
Total Staff Years									

Table 8-2: Implementation Workload Impact (RTP)

ETVS implementation will affect workload in the regions for Air Traffic (AXX-5XX), Regional
AF Maintenance (AXX-4XX), Facilities and Equipment (ANI-X40), and Regional Associate
Program Manager (ANI-X40) personnel. Increases will focus around site preparation and testing
activities, as described below.

Site Survey/Site Preparation Site surveys performed by the FAA will be overseen by regional F&E personnel (ANI-X40) and regional AT Requirements personnel (AXX-5XX). A contractor site survey will be ordered approximately eight (8) months prior to the ETVS delivery. Site preparation activity will follow the site survey and will be overseen by regional F&E personnel. The Technical On-site Representative (TOR) will coordinate all site survey and preparation activities and will act as liaison to the Contracting Officer's Technical Representative (COTR). Please refer to paragraph 13.2.2, Site Preparation Phase and to the Generic Site Implementation Plan (GSIP) found in Appendix A.

Test and Evaluation FAA Test and Evaluation (T&E) will require participation by regional AT and AF, AOS-510, and headquarters personnel. FAA personnel required to support contractor and government T&E activities are listed in table 9-6, Personnel Requirements to Support ETVS Testing, located in section 9.4.1, Personnel Requirements.

Staffing support briefings were conducted to identify regional concerns relating to system deployment staffing requirements. Impacts, if any, on facility/Regional AF personnel staffing levels will be assessed and resolved at the regional level. Deployment re-scheduling may be an option in reducing any unforeseen staffing shortages, if appropriate.

8.3   Training
Contractor and government representatives participated in a Training Guidance Conference held in September 1995 to discus the format for training deliverables, schedules, training locations, Commercial-Off-The-Shelf (COTS) and Non-Developmental Item (NDI) training materials, and FAA-STD-028B, Contract Training Programs, requirements.

8.3.1   Training Program
ETVS training has been developed to satisfy Air Traffic, Airway Facilities, AOS-510, and FAA Logistics Center requirements. The following information was extracted from the ETVS Integrated Logistics Support Plan (ILSP) dated February, 1997. The ILSP is currently being updated and a new revision is expected soon.

8.3.1.1 ETVS Orientation Course
The Orientation course provides an overview of Denro's installation and testing procedures and provides a detailed orientation on ETVS functionality and site operator and maintenance personnel responsibilities. This training is intended for personnel concerned with the installation and testing, e.g., Government Operational Test and Evaluation (OT&E), Government OT&E/Operational Evaluation testing, site acceptance testing, etc. Orientation course taught by the contractor at Denro have been assigned Course Number 48232.

The Orientation course has been augmented by AND-320/ASU-330 to include ETVS contract information of interest to Government Technical Onsite Representatives (TORs) and Region Facilities and Equipment (F&E) personnel. Two classes were taught (July and August 1996) for sites that were scheduled to have ETVS equipment installed through March 1997. All regions were represented in these classes. When a firm installation schedule is established by AND-320, each region can request up to two (2) classes of the augmented Orientation course. The classes

will be taught by an FAA Academy instructor at a location designated by the Region. Each class will accommodate up to 12 students. AFZ-100 will provide the funds for this training; Course Number 45010. Both the basic and the augmented Orientation courses are 24 hours long.

8.3.1.2 ETVS Operator/Supervisor Course

An Operation/System Administration course has been developed for Government air traffic controllers and supervisors. The course consists of two modules:

- The Operation module provides detailed instruction, including hands-on training, on the operation of the ETVS equipment. The Operation module is a prerequisite for the individuals selected to participate in the System Administration module.
- The System Administration module provides detailed instruction, including hands-on training, on configuring and reconfiguring the system, reconstructing position functions after interruptions, identifying and executing system communications and identifying error messages/indications and taking appropriate corrective action(s).

The course uses Computer Based Instruction (CBI) courseware operating on the FAA Computerized Air Traffic Training System (CATTS) platform which, at a minimum, consists of a 486/33 computer equipped with 16 mega bites (MB) random access memory (RAM), CD-ROM player, and sound card. The CBI software allows a student to insert and use facility specific data (i.e., radio frequencies, position maps, global maps and configurations, etc.,) and includes the ability to change/move frequencies and direct access (DA) keys to different locations within the pages provided.

8.3.1.3 ETVS Hardware Maintenance Course

This course provides detailed technical instruction, including hands-on training for site maintenance. Participants in this course should be electronics technicians or engineers knowledgeable about the repair of communications switching equipment. This training is intended for the AF technicians responsible for site/field maintenance of ETVS equipment. The Hardware Maintenance (HW) course has been assigned Course Number 40041 and is approximately 120 hours long.

8.3.1.4 Engineering Support Services Course

The Engineering Support Services Course provides detailed technical instruction, including hands-on training, for personnel responsible for second-level hardware, software, and firmware support. Participants in this course must have completed the ETVS Hardware Maintenance Course, be proficient in programming software, and capable of identifying engineering solutions to technical hardware and software problems

8.3.1.5 Depot Maintenance Training

Depot maintenance training for FAALC personnel (i.e., depot level repair) is a contract option that will be exercised if the contractor decides to cease depot repair for ETVS LRUs. This course will enable FAALC depot maintenance technician to diagnose and isolate faults down to the LRU component level. Government depot maintenance technicians will be trained perform repairs at the same level of expertise as contractor maintenance personnel. This course will be conducted by the contractor at either the contractor's facility or at the Mike Monroney

Aeronautical Center. Participants in this course must have completed the ETVS Hardware Maintenance Course.

8.3.2   Training Support

If the contractor provides training, it will include course materials in an FAA approved training material format. Course materials for FAAAC and field students will be retained upon completion of a course. Any special tools or test equipment required to conduct the training will be provided by the contractor

8.3.3   Personnel Skills

Knowledge of air traffic or maintenance procedures is required for personnel undergoing ETVS training. Personnel skills needed for each type of ETVS training are listed below.

8.3.3.1 ETVS Orientation Course

Participants will be government personnel concerned with the installation, testing, and acceptance of ETVS equipment.

8.3.3.2 ETVS Operator/Supervisor Course

The contractor will provide course materials, e.g., student hand-outs, for any courses it conducts. The contractor provided student materials will be retained by the students at the completion of the course. The Operation/System Administration, Hardware Maintenance, and Engineering Support Services courses have been developed in accordance with FAA-STD-028B. The contractor will deliver to the Government all course materials (e.g., instructor lesson plans, media materials, student materials, achievement tests, etc.,) ordered in the contract.

8.3.3.3 ETVS Hardware Maintenance Course

The ETVS Hardware Maintenance course will require participants to be Airways Facilities electronics technicians or engineers with experience in repair of communications switching equipment. Participants will have a background in digital logic and will have completed the technical training courses listed in section 6.0 of the ETVS ILSP.

8.3.3.4 Engineering Support Services Course

The Engineering Support Services course will require personnel to have the qualifications listed for the Hardware Maintenance course, as well as programming proficiency and an ability to identify engineering solutions to hardware and software problems.

8.3.3.5 Depot Maintenance Training

Participants in the Depot Maintenance Training course will have the qualifications required for the ETVS Hardware Maintenance Course and have at least three years of depot maintenance or equivalent experience.

8.3.4   Training Quotas

Requirements for training need to be identified to Air Traffic and Airway Facilities, with information copy to ARN-200, prior to the FAA annual call for training.
Training Schedules

Air Traffic and Airway Facility training schedules will be determined by ATX-100, Air Traffic Services Training Requirements Division..

8.4-8.19 (Reserved)

8.20   Status Assessment

Training courses for both AirTraffic and Airway Facilities has been developed and approved. No additional Human Resources Issues/ Risks have been identified

9.0   TEST AND EVALUATION

9.1   Overview of Test Program

The ETVS test program is comprised of contractor performed developmental and production testing and government performed operational testing. The P^3I implementation approach for the ETVS program will require initial testing of the core ETVS requirements, and, at a later date, the P^3I subsystems and interrelated core requirements. The first ETVS system produced that met the core requirements, was subjected to extensive developmental, production, and operational testing at the factory, the William J. Hughes Technical Center (WJHTC), and the designated key sites at Santa Barbara, CA (SBA) and Colorado Springs, CO (COS). Subsequent core requirements ETVS systems will undergo abridged production, developmental, and operational testing. Figure 9-1 depicts a summary of core requirements testing for the ETVS. In addition, following successful completion of Operational Test and Evaluation (OT&E) by ACT-340, ETVS was further evaluated by an Independent Operational Test and Evaluation (IOT&E) team.

Several subsystems of the ETVS, including the Communications Traffic Data (CTD), Management Information System (MIS), Remote Monitoring Subsystem (RMS), and digital ground-to-ground interfaces, are expected to be implemented via a P^3I program. If one or more of these systems are available from the vendor with the first production core ETVS they will be tested at the First Article Test. Because no contractor was able to meet all ETVS requirements, some normal P^3I developmental effort will be necessary in the future for the contractor to meet the exact requirements of the ETVS specification.

Each subsystem integrated into the ETVS will change the baseline system. The P^3I program will be implemented over an extended period of time and on an as ordered basis. Each P^3I subsystem ordered will undergo a stand alone test program categorized into unit, subsystem, and integration testing to ensure a smooth transition when P^3I subsystems are being retrofitted into fielded switches. The amount of testing required and the level at which testing occurs will depend on the degree of development required for the subsystem, and the degree of integration required with the baseline ETVS. Once the core requirements ETVS is upgraded with the P^3I subsystem (called upgraded ETVS), it will undergo system, production, and operational testing. The second and subsequent upgraded ETVS switches will undergo production, developmental, installation, and operational testing as required. Figure 9-2 depicts a summary of testing for upgraded ETVS systems.

9.1.1   Government Test Program

The government test program involved operational testing of the first production core requirements ETVS, second and subsequent core requirements ETVS switches, and initial P^3I subsystems and associated core requirements ETVS switches. Government operational testing will occur serially from Integration to Operational, to Shakedown testing. Descriptions of operational testing are given below.

9.1.1.1 Operational Test and Evaluation (OT&E)/ Integration Test

OT&E/Integration testing verified the NAS end-to-end performance as defined by the system and subsystem level requirements in NAS-SS-1000, and ensured that the ETVS does not adversely affect performance in the NAS. This testing examined the interface between the ETVS and the NAS environment in which it will operate. NAS-SS-1000 requirements affected by changes to the core ETVS system with the addition of the P^3I subsystem will be investigated. OT&E/Integration testing was conducted by ACT-340 on the first system at the William J. Hughes Technical Center (WJHTC). Some testing at subsequent sites may be required if any interface at a specific site is different from those found at the Technical Center.

9.1.1.2 OT&E/Operational Test

OT&E/Operational testing, conducted on the first system by ACT-340 at the Technical Center, verified the operational effectiveness and user suitability of the ETVS. This testing will be conducted in a realistic environment to ensure that the core requirements or P^3I upgraded ETVS can be operated effectively by Air Traffic (AT) personnel in the tower and TRACON environments. If site configurations substantially different from those that can be emulated at the Technical Center are found, OT&E/Operational testing may be conducted at subsequent sites.

9.1.1.3 OT&E/Shakedown Test

OT&E/Shakedown testing similar to the OT&E/Operational test, was conducted at the first field site, Santa Barbara, CA (SBA), to verify the overall functionality of the ETVS and its supporting elements. Testing verified both AT operational and AF supportability and maintainability procedures. Field Shakedown testing, similar to the OT&E/Shakedown test conducted on the first ETVS system, will be conducted at all subsequent sites.

9.1.2   Contractor Test Program

The contractor test program involved developmental and production testing of all core requirements and P3I subsystems. The Developmental Test and Evaluation (DT&E) program for the P^3I subsystems ensured that each subsystem developed meets all of the specification requirements and that these subsystems can be integrated successfully into the ETVS baseline. A secondary objective of this DT&E is to verify that fielded ETVSs can be successfully retrofitted with P^3I subsystems and that the final fielded system meets all the requirements of the baselined ETVS system. The benchmark for determining a successful DT&E program will be a baseline ETVS containing the P^3I subsystem that meets all of the specified requirements. Complete descriptions of each type of ETVS developmental and production testing are given below.

9.1.2.1 Core Requirements ETVS

First Article Test The First Article Test (FAT), performed on the first production core ETVS only, was a comprehensive verification of the ETVS design. This was accomplished at the contractor's facility, and used contractor supplied personnel, test equipment, test jigs, interface equipment, and any simulator subsystems required. The First Article Test procedures were developed by the contractor and approved by AND-320. ETVS specification requirements tested included functional, physical, performance, and interface requirements, as well as compliance with industry standards.
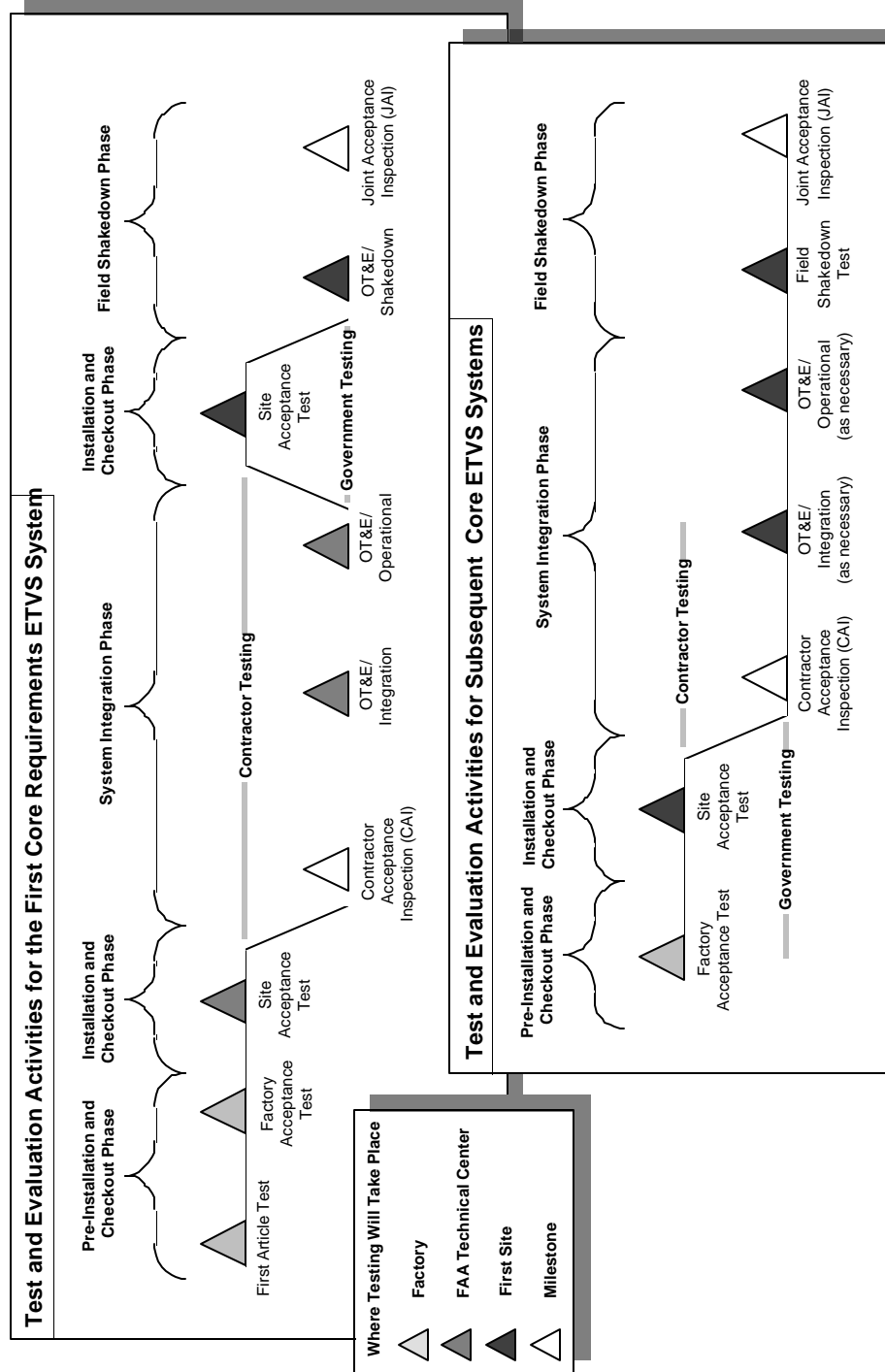
Figure 9-1: Test and Evaluation Activities for Core Requirements ETVS Systems
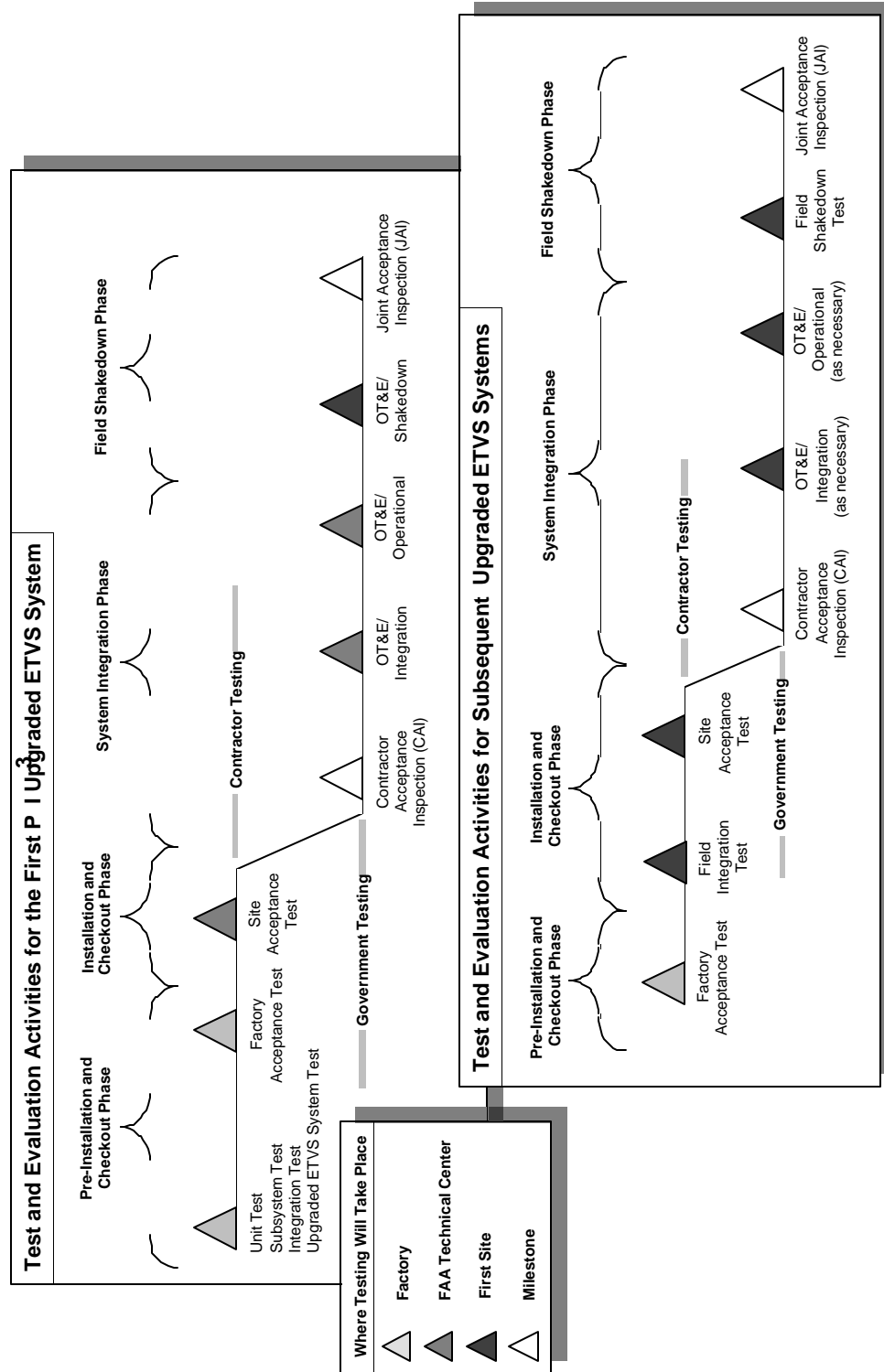
Figure 9-2: Test and Evaluation Activities for P³I Upgraded ETVS Systems

Production Acceptance Test and Evaluation (PAT&E) The Production Acceptance Test (PAT), also known as the Factory Acceptance Test, will be performed on all core ETVS systems. The PAT will test critical functional and performance parameters selected from the First Article Test. The first core ETVS underwent a First Article Test, followed by a PAT to verify PAT procedures. Follow-on ETVS systems will undergo only the PAT to verify aspects of the system that could possibly be affected by the production process. Critical criteria looked at by the PAT include parameters affected by the selection of components, production process, or variance in system architecture.

Installation Test and Evaluation The Installation Test, performed on all core ETVS systems, will take place at each site after installation. Contractor installation testing will ensure successful integration of the ETVS into the facility. A government witnessed Site Acceptance Test will ensure that the ETVS meets the specific functional and performance requirements particular to each site.

9.1.2.2 First P^{3}I Subsystem and Associated Core Requirements ETVS

Design Review Each P^{3}I will undergo a design review cycle to ensure the contractor understands the requirement and has a plan for design and implementation that meets the expectations of the government. Preliminary and critical design reviews will be held as necessary at the contractor's facility to expedite the design process.

Unit Testing Each subsystem under development will subdivide into units of software and hardware. These units will be tested to ensure the function provides the proper inputs and outputs to other cooperating units. In addition, any unit changes required in the baseline ETVS will be developed and tested during this phase of testing. Unit testing will be conducted at the contractor's facility and may be witnessed by authorized government representatives as required. Results of unit tests will be provided to the government in activity reports.

Subsystem Testing The integrated P^{3}I units will form the subsystem being purchased. Subsystem testing will ensure the subsystem meets the expected input and output parameters specified. Any modifications to the ETVS baseline requiring subsystem testing will also be verified during this phase of testing. The subsystem will be tested in the contractor's facility using contractor provided personnel, test equipment, test jigs, and any input or output test collection or stimulus devices required. This testing will follow a contractor developed and government approved procedure. The test may be witnessed by the government and the contractor will be required to submit results for review.

Integration Testing The final integration of the P^{3}I subsystem and the ETVS subsystem will require integration testing to ensure the two subsystems can function together. Integration testing will also ensure that the interface meets the requirements of any interface requirements documents and interface control documents. Integration testing will require the base ETVS and resulting end system to undergo a series of tests to ensure the functional and performance attributes of the system remain within specified tolerances. This testing will take place at the

contractor's facility and will be witnessed by the government. The acceptance of results from this testing will constitute the acceptance of the P^{3}I subsystem.

Upgraded ETVS System Test After the ETVS-P^{3}I interface has undergone successful integration testing, the combined unit will undergo integration testing and system testing. This testing will assure the FAA that the resulting baseline system performs and functions in accordance with the specification. After a system wide P^{3}I has been implemented in the ETVS, a new baseline will be established and the process will be repeated for each system wide P^{3}I ordered. It is probable that some P^{3}I will not result in a system wide baseline change. While this will create different baselines for different applications, it will have little affect on the testing required to ensure proper integration of P^{3}I.

Production Acceptance Test and Evaluation (PAT&E) The Production Acceptance Test (PAT), also known as the Factory Acceptance Test, will consist of critical functional and performance parameters selected from the upgraded ETVS System Test. The P^{3}I ETVS will undergo a System Test, followed by a PAT to verify PAT procedures. Follow-on upgraded ETVS systems will undergo only the PAT to verify aspects of the system that could possibly be affected by the production process. Critical criteria looked at by the PAT include parameters affected by the selection of components, production process, or variance in system architecture.

Installation Testing and Site Acceptance Test Retrofitting fielded systems with an upgrade will require that a combination of integration and installation testing be performed on the fielded system. The contractor will be required to install the upgrade, verify the upgrade operates in accordance with the requirements, and verify the upgraded system operates in accordance with its performance parameters. This will require the contractor to perform integration testing on site. In addition, the newly upgraded system will be subjected to a comprehensive acceptance test addressing all requirements inclusive of the baseline ETVS and the upgrade P^{3}I subsystem. Each site may require specific tailoring of the installation and acceptance plan to accommodate the requirements of the site.

9.1.2.3 Second and Subsequent P^{3}I Subsystem and Associated Core Requirements ETVS Production Acceptance Test and Evaluation (PAT&E) The Production Acceptance Test (PAT) will consist of a subset of critical functional and performance parameters tested during the upgraded ETVS System Test. Follow-on upgraded ETVS systems will undergo the PAT to verify aspects of the system that could possibly be affected by the production process. Critical criteria looked at by the PAT include parameters affected by the selection of components, production process, or variance in system architecture.

Field Integration Test and Evaluation Retrofitting fielded systems with an upgrade will require a combination of integration and installation testing. The contractor will be required to install the upgrade, verify the upgrade operates in accordance with the requirements, and verify the upgraded system operates in accordance with its performance parameters. This will require on-site contractor integration testing.

Upgraded ETVS Site Acceptance Test The newly upgraded system will be subjected to a comprehensive acceptance test addressing all requirements inclusive of the baseline ETVS and the upgrade P^3I subsystem. Each site may require specific tailoring of the installation and acceptance plan to accommodate the requirements of the site.

9.2   T&E Schedule

Operational Test and Evaluation (OT&E) conducted by ACT-340 was successfully completed in May 1998.

9.3   T&E Responsibility Matrix

9.3.1   Government Test Organization

Government test and evaluation responsibilities are summarized in tables 9-1 through 9-4. Descriptions of the roles and responsibilities of each organization involved in test and evaluation activities follow the summary tables.

ETVS Test & Evaluation Responsibilities
First Core Requirements ETVS

Site Implementation Phase	Test Performed	Where	By Whom
Pre-Installation and Checkout	First Article Test	Contractor Facility	Contractor
	Factory Acceptance Test	Contractor Facility	Contractor
Installation and Checkout	Site Acceptance Test	FAA Technical Center	Contractor
	Site Acceptance Test	First Site	Contractor
System Integration	OT&E/Integration	FAA Technical Center	ACT-340
	OT&E/Operational	FAA Technical Center	ACT-340
	OT&E/Integration	First Site	ACT-340
	OT&E/Operational	First Site	ACT-340
Field Shakedown	OT&E/Shakedown	First Site	AOS-510

Table 9-1: T&E Responsibilities for the First Core Requirements ETVS

Descriptions of the roles and responsibilities of each organization involved in test and evaluation activities are given below.

9.3.1.1 Voice Switching and Recording IPT Lead

The FAA IPT Lead for Voice Switching and Recording is responsible for the overall management of the project. Responsibilities related to the test program include arranging for T&E support, joint preparation of the test and evaluation master plan, obtaining approval from the Test Policy Review Committee (TPRC) for the test program, and approval of budgets to fund T&E activities. In addition, the IPT Lead is responsible for coordination of IPT requested AOS support for shakedown/operational testing, and monitoring test activities through the In Service Decision (ISD).

ETVS Test & Evaluation Responsibilities Second and Subsequent Core Requirements			
Site Implementation Phase	**Test Performed**	**Where**	**By Whom**
Pre-Installation and Checkout	Factory Acceptance Test	Contractor Facility	Contractor
Installation and Checkout	Site Acceptance Test	At Site	Contractor
System Integration	OT&E/Integration (As Necessary)	At Site	ACT-340
	OT&E/Operational (As Necessary)	At Site	ACT-340
Field Shakedown	Field Shakedown Test	At Site	AOS-510

Table 9-2: T&E Responsibilities for Subsequent Core Requirements ETVSs

ETVS Test & Evaluation Responsibilities First P3I Modified ETVS			
Site Implementation Phase	**Test Performed**	**Where**	**By Whom**
Pre-Installation and Checkout	Unit Testing	Contractor Facility	Contractor
	Subsystem Testing	Contractor Facility	Contractor
	Integration Testing	Contractor Facility	Contractor
	System Test	Contractor Facility	Contractor
	Factory Acceptance Test	Contractor Facility	Contractor
Installation and Checkout	Site Acceptance Test	FAA Technical Center	ACT-340
System Integration	OT&E/Integration	FAA Technical Center	ACT-340
	OT&E/Operational	FAA Technical Center	ACT-340
Field Shakedown	Field Shakedown Test	First Site	AOS-510

Table 9-3: T&E Responsibilities for the First P[3]I Upgraded ETVS

9.3.1.2 Product Team Member for Testing

The Product Team Member for Test, assigned from the William J. Hughes Technical Center (WJHTC), Voice Switch Automation Division, is responsible for supporting the IPT Lead in all test related matters. As the IPT agent for T&E, the Product Team Member for Test is responsible for managing the overall test and evaluation program including maintenance of the test schedule, coordination of tests, and ensuring that all test requirements are met. The Product Team Member for Test is responsible for co-authoring and implementing the test program prescribed by the ETVS Test and Evaluation Master Plan (TEMP). Responsibilities related to

implementing the test program include monitoring the selected contractor's testing, developing and implementing the Operational Test and Evaluation (OT&E)/Integration and OT&E/Operational test phases, monitoring the OT&E/Shakedown testing, and making recommendations to the IPT Lead.

ETVS Test & Evaluation Responsibilities Second and Subsequent P3I Modified ETVS			
Site Implementation Phase	**Test Performed**	**Where**	**By Whom**
Pre-Installation and Checkout	Factory Acceptance Test	Contractor Facility	Contractor
Installation and Checkout	Field Integration Test	First Site	Contractor
	Site Acceptance Test	First Site	Contractor
System Integration	OT&E/Integration (As Necessary)	First Site	ACT-340
	OT&E/Operational (As Necessary)	First Site	ACT-340
Field Shakedown	Field Shakedown Test	First Site	AOS-510

Table 9-4: T&E Responsibilities for Subsequent P^{3}I Upgraded ETVSs

9.3.1.3 Product Team Member for Engineering
The Product Team Member for Engineering, AND-320, Voice Switching and Recording Engineering Division, supports the IPT Lead in all engineering related activities. The Product Team Member for Engineering is responsible for developing the specifications which define the ETVS. The Product Team Member for Engineering will review test plans, procedures and test reports. In addition, the Product Team Member for Engineering will witness all test activities.

9.3.1.4 Product Team Member for Quality
The Product Team Member for Quality Assurance Branch, supports the IPT for all quality related activities. The primary responsibility of the Product Team Member for Quality is to monitor the contractor production facilities to ensure compliance with FAA quality standards (FAA-STD-013B and FAA-STD-016). The Product Team Member for Quality will monitor all contractor test activities, and is responsible for monitoring production acceptance testing in particular.

9.3.1.5 Product Team Member for System Integration and Analysis
Systems Integration and Analysis, ASD-120, supports the IPT in all system engineering related activities. The Product Team Member for System Integration and Analysis is responsible for configuration management for the NAS level system requirements and providing the NAS level OT&E/ Integration test requirements from the system requirements. The Product Team Member for System Integration and Analysis is also responsible for developing, in conjunction with user organizations (air traffic and airway facilities), the Operational Requirements Document (ORD),

which in turn provides operational characteristics and issues on which the operational test program is based.

9.3.1.6 Product Team Member for Air Traffic Requirements

ARN-200, Air Traffic Systems Requirements Service, Communications/ Datalink Systems Division, supports the IPT in all requirements related activities. The Product Team Member for Air Traffic Requirements provides the requirements on which the ETVS program is based. Product Team Member for Air Traffic Requirements responsibilities related to test include providing user requirements for the TEMP, monitoring all DT&E/PAT&E activities, participating in the development and implementation of the operational test program, and managing the participation of regional air traffic (AT) and airway facilities (AF) personnel in operational testing. The Product Team Member for Air Traffic Requirements will also review all plans, procedures and reports related to operational testing.

9.3.1.7 Navaids/Communications Support Engineering Branch

AOS-510, Communications Support Engineering Branch, is responsible for developing and implementing the OT&E/Shakedown test program. AOS-510 developed, in coordination with ARN-200, shakedown test plans and procedures. After conducting the shakedown tests, they prepared the test report. They may also participate in any follow-on field shakedown testing required.

9.3.1.8 Office of Independent Operational Test and Evaluation Oversight (IOT&E)

ATQ assesses compliance with the system requirements statement and operational readiness criteria. The office of IOT&E independently asseses the operational effectiveness and suitability of the ETVS, based on the results of DT&E and OT&E, and reports those results directly to the Associate Administrator for Air Traffic Services, ATS-1. The office of IOT&E is a member of the Test Policy Review Committee (TPRC) for level I MA systems. In addition to providing an independent operational assessment based on test results, IOT&E will also review the TEMP and any other test planning and reporting documentation required.

9.3.1.9 Department of Defense Program Office

The DoD program office will coordinate with the FAA on all DoD specific requirements of the ETVS. A representative of the DoD program office will be a member of the TPRC and will review all test documentation to assure that DoD critical T&E concerns have been addressed.
9.3.1.10 Engineering Specialties and Configuration Management
Engineering Specialties, ASD-140, is responsible for reviewing the test and evaluation master plan. ASE-600 will also act as the TPRC Secretariat, planning and scheduling all TPRC meetings.

9.3.1.11 Test Policy Review Committee

The Test Policy Review Committee (TPRC) is comprised of senior managers from various FAA organizations who have responsibility with regard to the promulgation of FAA NAS Test and Evaluation (T&E) policy. It supports T&E policy, standards, and definitions by providing management oversight into the accountability and compliance of participants in the T&E program. The TPRC approves the Test and Evaluation Master Plan (TEMP) and all test policy waivers. The TPRC approves revisions to TEMPs, and also resolves T&E issues that can't be

resolved at lower levels. The TPRC will be chaired by ASE-600. Membership will include the organizations listed in Table 9-5, ETVS Test Policy Review Committee (TPRC) Membership. (Source: FAA Order 1810.4B, 11.a, 11.b, part 2 /80, part 3 /1.a)

ETVS Test Policy Review Committee (TPRC)		
Position	**Routing Symbol**	**Office**
Secretariat	ASD-600	Engineering Specialties and Configuration Management
Member	AND-300	Integrated Product Team for Communications
Member	ASE-11	NAS Systems Engineering Service
Member	ANS-1	NAS Transition and Integration Service
Member	AND-1	Associate Administrator for NAS Development
Member	AND-3	Special Assistant to AA for NAS Development (AND-1)
Member	ATR-1	Air Traffic Plans and Requirements Service
Member	ALM-1	Requirements and Life Cycle Management
Member	AFS-1	Flight Standards Service
Member	ACW-1	Engineering, Integration, and Operational Evaluation Service
Member	FAA/DoD JPCO	DoD/Joint Program Coordination Office

Note: This table was not updated for this revision

Table 9-5: ETVS Test Policy Review Committee (TPRC) Membership

9.3.2   Contractor Test Organization

The organizational structure, including key technical and management personnel, that will support the conduct of the contractor test program will be identified in the contractor's Site Installation Management Plan and will be summarized in subsequent PIP revisions.   (Source: ETVS Data Item Description E01, 4/1/94, para 10.2)

9.4   T&E Field Support Requirements

ETVS implementation at operational sites will take place on a non-interfering basis as coordinated with the regionally appointed Technical On-site Representative (TOR).

9.4.1   Personnel Requirements

T&E personnel will be required to support implementation during off-peak hours. Numbers and types of FAA personnel required to support contractor and government test and evaluation activities are listed in Table 9-6, Personnel Requirements to Support ETVS Testing.

9.4.2   Test Equipment Requirements

The contractor will furnish all tools, test equipment, and test jigs for installation, testing, and maintenance activities on the ETVS during installation and site acceptance. (Source: ETVS Statement of Work, 8/9/94, para 3.5.4.2)

Test equipment required for FAA Operational Test and Evaluation (OT&E)/Integration and OT&E/Operational testing will be identified in the Site Integration Test Plan developed by ACT-340, Voice Switching Automation Division. Test equipment requirements for OT&E/Shakedown and Field shakedown testing will be identified in the Shakedown Test Plan by AOS-260, NAV/COM Support Engineering Branch.

9.4.3   System Access

T&E personnel will require access to the facility control tower/TRACON. Although security clearances will not be required for installation team members, access to the installation facility will be required. The Technical Onsite Representative (TOR) will be responsible for providing badging and briefings for installation personnel during site installation visits. Specific system access requirements will be identified in the Site Installation, Integration, and Acceptance Test Document. Refer to section 8.1.3, Security Clearances, for more details concerning system access during testing. (Source: ETVS Statement of Work, 8/9/94, para 3.5.1.2, 3.5.3.4)

9.4.4   Space Requirements

Space requirements to support contractor testing activities will be identified as an appendix to the Site Installation, Integration, and Acceptance Test Document (SIIATD). Space requirements to support OT&E/Integration and OT&E/Operational testing will be identified in the Site Integration Test Plan developed by ACT-340, Voice Switching Automation Division. Space requirements to support OT&E/Shakedown and Field Shakedown testing will be identified in and the Shakedown Test Plan by AOS-260, NAV/COM Support Engineering Branch. (Source: ETVS Statement of Work, 8/9/94, para 3.5.1.2)

9.5   T&E Program Status

Testing of the core requirements has progressed to completion of OT&E. IOT&E has resumed and the ATS test team is currently conducting their evaluation.

9.5.1   Test Results Summary

OT&E was completed in May 1998. IOT&E was stopped in June 1998 until a list of 23 discrepancies could be corrected. IOT&E resumed in August. Successful completion of IOT&E is necessary for the In-Service Decision to occur.

9.5.2   Outstanding Program Trouble Reports (PTR)

Resolution of PTRs will follow the discrepancy correction process outlined below.

Personnel Requirements to Support ETVS

T&E Participant Test Phase	Contractor Installation/Site Acceptance Test	OT&E/Integration OT&E/Operational	OT&E/ Shakedown	Field Shakedown
ACT-340	2	5	2	—
AND-320	1	1	1	—
AOS-510	1*	1	5	2
RAPM (ANI-X40)	1*	1	1	—
Regional F&E (ANI)	2	2	3	—
Regional SSC	1	1	1	2
Regional AT (5XX)	0	2	3	1

* AOS-510 personnel and RAPM are not required to support Installation and Site Acceptance Testing activities.

Table 9-6: Personnel Requirements to Support ETVS Testing

9.5.3   Discrepancy Correction Process

Where the contractor has obtained test results that do not indicate verification of requirements, the contractor will log the discrepancy in accordance with the Test Procedures DID, ETVS-C02. The contractor will determine the cause for the noncompliance and report it to the government prior to submission for re-test. All corrective action will be the responsibility of the contractor. On any re-test, the contractor will be responsible for identifying the cause of the problem, identifying a solution to the problem, and proposing the fix to the government. In addition, the contractor will be responsible for identifying any other ETVS subsystems affected by the problem or the proposed solution. The government will approve all corrective action before it is taken, and all corrective action will be completed prior to submission for re-test. The re-test will be conducted in accordance with the original test procedure or as approved by the government. (Source: ETVS Statement of Work, 8/9/94, para 3.4.1.5)

9.6-9.19 Reserved

9.20 Status Assessment

Upon successful completion of IOT&E, the system will be ready for ISD.

10.0   SYSTEM SUPPORT

10.1   System Support Concept

Site Level Maintenance will be accomplished at each site by AF technician after government site acceptance of the ETVS equipment. Site level maintenance involves troubleshooting failures to the Line Replaceable Unit (LRU) and replacing failed items with operative spares. It also involves replacement of expendable components and performing preventive maintenance actions on the ETVS equipment.

Depot Level Maintenance entails troubleshooting and repairing failed LRUs to the component level. The FAALC will manage the Contractor Repair Service (CRS) effort with the contractor.

- During the Pre-Acceptance period, the contractor will be responsible for all equipment maintenance, including spares and test equipment, at each site until the site is accepted by the Government. (Source: ETVS Statement of Work, 8/9/94, para 3.6.6.1)
- Emergency replacement will require the contractor to ship serviceable components so that they are received at the Government site where required, within 24 hours, including weekends and holidays, after receipt of a telephone request from the FAALC official designated in writing by the Government Contracting Officer. (Source: ETVS Statement of Work, 8/9/94, para 3.6.6.4.1)
- Routine repair will require the repair of faulty LRUs to be completed within thirty (30) calendar days after receipt of failed LRUs by the contractor. LRUs will be repaired to restore them to a serviceable operating condition meeting the performance requirements of the ETVS Specification. All repaired LRUs will successfully undergo a system level test prior to shipment to the government. (Source: ETVS Statement of Work, 8/9/94, para 3.6.6.4.1)

Supply Support during the 12 month warranty period sites will ship faulty LRUs directly to the contractor for replacement/repair. After the warranty period, sites will ship faulty LRUs to the FAA Logistics Center (FAALC). FAALC has agreed to assume responsibility for ETVS supply support.

Technical Assistance will be provide by the Communications Engineering Branch, AOS-510, located at the Mike Monroney Aeronautical Center. AOS-510 will provide technical assistance 24 hours per day, 7 days per week via the AOS-510 hotline; duty hours - (405) 954-0066; nonduty hours - (405) 954-3583.

10.1.1 Hardware

AF technicians will be trained prior to site acceptance. After site acceptance, the AF site technician will be responsible for site maintenance actions. Maintenance tasks performed by the technician will be limited to those tasks required to accomplish on-site preventive and corrective maintenance. No LRU repair will take place below depot level. The FAALC will ship a serviceable LRU to the ETVS site upon request. Failed LRUs will be shipped by the site to the FAALC, or to the contractor, as directed by the FAALC.

10.1.2 Software

AOS-510 will be responsible for software maintenance for the ETVS equipment life cycle.

10.2   Special Support Facilities

No special requirements for government support facilities have been identified. All depot level maintenance for the ETVS will be performed by the contractor at the contractor's facility. No changes to government facilities are anticipated unless the government chooses to assume depot level maintenance on the ETVS. Site maintenance activities will be accomplished by the contractor until training is in place for FAA Regional AF maintenance technicians and technical instruction books for ETVS equipment are received from the contractor. After FAA technicians are trained and the instruction books are available, the government will assume site maintenance activities. No special support facilities, however, will be required by the site maintenance technicians to accomplish ETVS site maintenance. (Source: ETVS Statement of Work, 8/9/94, para 3.6.6.4; ETVS Integrated Logistics Support Plan, 2/18/94, para 8.2)

10.2.1 Mike Monroney Aeronautical Center

10.2.1.1 Restoration Response Level

This section is not applicable to this document.

10.2.1.2 Field Level Maintenance

This section is not applicable to this document.

10.2.1.3 Depot Level Maintenance

FAALC will be responsible for providing depot level support until the ETVS is replaced.

10.2.1.4 Engineering Support

Engineering Support will be provide by AOS-510, Communications Engineering Support Branch, located at the Mike Monroney Aeronautical Center. AOS-510 will provide technical assistance 24 hours per day, 7 days per week via the AOS-510 hotline; duty hours - (405) 954-0066; nonduty hours - (405) 954-5839.

10.2.2 FAA Technical Center

This section is not applicable to this document. The FAA Technical Center will not perform system support activities for the ETVS program.

10.3   Materiel Support

10.3.1 Project Materiel

The FAA Logistics Center (FAALC) will provide supply support for the ETVS project. They will also act as a distribution center for ETVS site spares, re-supplying site stock as it is depleted. Any special test equipment required for system maintenance will be provided with the ETVS.

10.3.2 Provisions and Supply Support

The contractor will provide a copy of the recommended site specific spares list as an appendix to the Site Installation, Integration, and Acceptance Test Document (SIIATD). ARN-200, Air Traffic Systems Requirements Service, Communications/ Datalink Systems Division, in concert with the contractor will determine the candidate LRUs and quantities for stocking at individual sites. These site spares will be delivered to the site with the ETVS equipment. (Source: ETVS Statement of Work, 8/9/94, para 3.5.1.2, 3.6.3.3)

10.3.3 Packaging, Transportation, and Storage

All ETVS equipment and spares delivered to sites will be packaged and marked in accordance with ASTM-D-3951, MIL-STD-2073-1, and MIL-STD-129. ETVS equipment and components shipped to the FAA Logistics Center (FAALC) for storage will be individually packaged. Common hardware items will be packed in multiple unit pack quantities as supplied through retail trade channels. A more detailed description of packaging requirements can be found in Section D, Packaging and Marking, of the ETVS contract. Failed LRUs shipped from the site to the FAALC will be packed in the container used to ship the replacement LRU from the FAALC to the site. The FAALC will use reusable containers to pack and ship Exchange and Repair (E&R) items to the contractor for repair.

All materials to be stored at the FAALC will be handled and marked according to MIL-STD-129L. The exterior shipping container will also be marked with the serial number, part number, warranty expiration date, contract number, and contract line item number.

The FAALC, ETVS site personnel, and the contractor will use established FAA guidelines for shipping and transporting ETVS material by the most economical means available. (Source: ETVS Statement of Work, 8/9/94, para 3.5.3.1; ETVS Integrated Logistics Support Plan, 2/18/94, para 9.1, 9.2)

The contractor is responsible for having the ETVS equipment delivered to the site , off-loaded at the site, and for disposing of packing materials. The contractor's Site Installation, Integration, and Acceptance Test Document (SIIATD) will include site specific instructions for unpacking, handling, and inventorying ETVS equipment. The SIIATD will also include instructions for disposal of packing and other waste material. (Source: ETVS Data Item Description E02, 4/1/94, para 10.3.2.c)

10.4   Technical Documentation

10.4.1 Hardware Documentation

No design documentation will be provided with the ETVS other than the System Requirement Allocation Document (SRAD). The SRAD will demonstrate the system's compliance with the ETVS specification by describing the specific characteristics of subsystems or components that will be relied upon to meet each specification requirement. A single unbound, camera ready reproducible quality copy of the SRAD will be delivered to AND-320. No magnetic copy will be required. The SRAD will be reviewed for completeness and accuracy by AND-320, ASU-330, ACT-340, AOS-510, and ESC/TGN. (Source: ETVS Data Item Description B08, para 4/1/94, 3.1; ETVS CDRL B08, para 4/1/94)

A complete set of technical data documentation, including proprietary data, will be placed with a third party escrow agent in the event that the government assumes responsibility for maintenance level repair of the ETVS. (Source: ETVS Statement of Work, 8/9/94, para 3.6.7)

10.4.2 Software Documentation

No proprietary software documentation will be provided with the ETVS.

10.4.3 Procedural Documentation

The contractor will supply a technical instruction book to support system installation, troubleshooting, and site maintenance. The technical instruction book will document complete installation, operation, and site maintenance of all ETVS hardware, software, and firmware, and will include a level of detail that will provide a thorough understanding of all ETVS functions. The manual will allow an ETVS technician to isolate the failure to the LRU level. A single unbound, camera ready reproducibility quality copy of the technical instruction book will be delivered to AOS-510, Communications Support Engineering Branch. Magnetic copies will be delivered to AOS-510 on 3.5" or 5.25" DOS-compatible floppy disks. The magnetic copies will be in ASCII format, Word Perfect 5.1, and AutoCAD12 format. The technical instruction book will be reviewed for completeness and accuracy by AND-320, ASU-330, AOS-510, AML-130, ARN-200, and ESC/TGN. After final approval, the contractor will deliver two copies to each FAA Regional Headquarters and one copy to each site. No restriction will be placed on the reproduction or use of the operator's manual or associated materials. (Source: ETVS Statement of Work, 8/9/94, para 3.6.5.3; ETVS CDRL F13, 4/1/94)

10.5-10.19   Reserved

10.20 Status Assessment

Additional or special system support facility requirements, beyond those normally provided at the FAA Logistics Center, are not anticipated. No system support issues/risks have been identified to date.

11.0   PROGRAM SCHEDULE INFORMATION

11.1   ETVS Program Master Schedule

The table below contains the ETVS program master schedule reflecting the accomplishment of significant milestone events as well as the date for the last planned ETVS delivery.

Program Implementation Milestones	Actual/Projected Schedule
Mission Need Approved	October 1992
Specification Published	July 1994
Contract Award	July 1995
OT&E Completed	April 1998
IOC Colorado Springs, Co	May 1997
IOC at Santa Barbara, CA	June 199
IOT&E Completed	August 1998
Y2K Compliance Certification	August 1998
In-Service Decision (ISD)	October 1998
Last Site Equipment Delivery	July 2003
Last Site JAI	August 2003
Last Site Equipment Removal	September 2003

Table 11-1 ETVS Program Master Schedule

11.2   Deployment Schedule

All sites designated to receive an ETVS are identified in Appendix C of this document. The MDFM will be updated on a regular basis to reflect deployment activities, and any changes to the schedule as events require.

11.3   Site Implementation Schedule

Activities to support ETVS site implementation will begin approximately twelve months prior to equipment delivery. Site implementation activities will continue until the replaced voice switch equipment has been removed. The milestones shown in table 11-2, Site Implementation Milestone Schedule, are typical of ETVS site implementations beginning with delivery to the third operational site. Considerable variances in potential switch sizes, configurations and operational site configurations exist. The time and resources required to achieve each of these milestones can range considerably and each installation schedule must be developed individually. The Generic Site Implementation Plan (GSIP) found in Appendix A, provides a list of tasks that can be used in development of installation schedules for each site.

A generic site implementation schedule has been provided Figure 11-2 Site. Details concerning individual site implementation schedules are determined by the program office and Regional personnel, and are not available in this document.

Site Implementation Phase	Estimated Start (days +/- equipment delivery)	Estimated Completion (days +/- equipment delivery)
Implementation Planning	-360	+ 30
Complete Worksheets	-210	-180
Site Survey	-180	-178
Site Preparation	-120	0
Equipment Delivery	**0**	**0**
INCO	0	+21
Site Integration	+21	+28
Conduct CAI, declare IOC	+28	+30
Dual Operations	N/A	N/A
Site Shakedown/ Familiarization	+30	+60
Conduct JAI, declare ORD	+60	+62
Equipment Removal	62	90

Table 11-2: Implementation Milestone Schedule

11.4   Schedule Dependencies

ETVS implementation may be dependent on the completion of any construction projects where the facility Electronic Installation period slips to post delivery of the ETVS. The RAPMs must ensure that AND-320 is made aware of any schedule slips in construction activities that will affect the ETVS installation.

11.5-11.19   Reserved

11.20 Status Assessment

Current scheduling is in concert with regional planning and has been coordinated by the product team, AND-320.

12.0   ADMINISTRATION

12.1   Acquisition Program Summary

In response to a March 1993 request for information, twelve voice switch vendors expressed an interest in participating in a procurement for ETVS equipment. Eight of the vendors provided substantive comments on the ETVS specification. These vendors met with the government to discuss the ETVS spec and brief their products. Several vendors also provided demonstrations of their voice switching equipment. Based on information from these meetings, demonstrations, and comments, the program matrix team concluded that NDI systems were available that satisfied the core ETVS requirements.

The ETVS acquisition was a full and open competition contract. The ETVS RFP identified basic core requirements to be available at contract award. A subset of items that may not be immediately available may be implemented as P^3I.

12.1.1 Market Survey

The ETVS market survey identified 8-10 firms that could meet core requirements, such as basic G/G and A/G communications plus associated functions and system size (number of positions and interfaces). Several FAA incumbents can currently meet all of the ETVS requirements. None of the contractors surveyed, can meet all of the FAA unique requirements right now. Some development effort will be needed to meet all requirements. (Source: ETVS Market Survey Report, 11/11/93)

12.1.2 Acquisition Strategy

The ETVS acquisition effort is intended as an NDI procurement with P^3I increments to support features not included in NDI switches. New or unique requirements will be segregated into individual packages and development programs may be established in parallel with basic system deployments on a cost-reimbursed basis. These improvement packages may be ordered as they are completed for retrofitting at fielded ETVS sites. The best candidates for P^3I packages are an RMMS interface, a management information system, digital interfaces, and provisions for communications traffic data collection. The P^3I strategy allows the program office to field new systems early in the procurement while providing more precise control over development and upgrade activities. Individual improvements can be accelerated, changed, or canceled without disrupting the entire program.

12.2   Contracting Information

12.2.1 Prime Contract

The ETVS contract was awarded to Denro, Inc, Gaithersburg, MD, on July 26, 1995.

12.2.2 Service Contracts

No service contracts are anticipated at this time.

12.2.3 Program Support Contracts

ARINC Research Corporation is providing technical support to the ETVS IPT/Contracting Officers Technical Representative (COTR), i.e., AND-320 on the ETVS acquisition effort. The ARINC support staff is located at 600 Maryland Ave., SW, Suite 500, Washington, DC 20024. An engineering support contract, COMTAC, comprised of multiple contractors is supplying additional engineering support to the ETVS program IPT/COTR.

12.2.4 Regional Contracting

The ETVS will be a turnkey installation. Site preparation materials will be funded by the program office, AND-320 (see section 7.1.2.1). Site preparation labor activities will be funded by the region and performed by regional personnel or support contractors as determined by the region. Schedule and manpower consideration may require utilization of an omnibus support contract for the completion of site preparation activities, such as drilling anchor holes in floors and running communications and power cabling at each site. The use of a support contractors to complete site preparation will be determined on a site by site basis by the region. Funding for support contracts for the completion of site preparation will be funded by the region.

12.2.5 GFP/GFI/GFE Obligations

Government Furnished Property (GFP) will not be required for the installation or operation of the ETVS. Government Furnished Information (GFI) Site drawings must be made available at the contractor site survey so they can be verified and updated if necessary. Updated site drawings will be included in the SIIATP as "as-built" drawing packages. (Source: ETVS Acquisition Plan, 3/28/94)

New ETVS peripheral equipment (i.e., headsets, handsets, and footswitches) will not be routinely issued with each ETVS switch. If a site currently uses peripheral equipment that will be compatible with the ETVS switch, the site will be required to retain and use the current peripheral equipment with the ETVS. If a site currently uses peripheral equipment that will not be compatible with the ETVS, the site will be issued the appropriate peripheral equipment. The following procedures will be used to identify, validate, and procure the peripheral equipment required by each site.

- Each site will identify in the site survey worksheets, or by separate correspondence to ARN-200/ AND-320, the peripheral equipment (i.e., name, part number, manufacturer, and quantity) currently on hand. If a site requires more peripheral equipment than currently on hand, the site must provide justification in writing to ARN-200/ AND-320 for an increase in quantity.
- ARN-200 will validate each site's requirements for peripheral equipment.
- After the requirement is validated, ARN-200 will direct the FAA Logistics Center (FAALC) to order the equipment and to have the vendor(s) ship the equipment directly to the site. The delivery of the peripheral equipment will coincide as closely as possible with the delivery of the ETVS equipment. Funding for validated new peripheral equipment requirements will be provide to FAALC by AND-320.

12.3   Program Management (PM)

12.3.1 Product Team Organization

AND-320, Integrated Product Team for Voice Switching and Recording is responsible for providing direction for the development, budgeting, acquisition, testing, product improvement, and fielding of this program. AND-300 serves as the spokesperson for this program with international organizations and foreign governments, other Federal departments and agencies, aviation user groups, the general public, and Congress.

12.3.2 Integrated Product Team (IPT)

See Table 12-1, ETVS/AND-320 Integrated Product Team, for the names and telephone numbers of personnel supporting the program manager on the ETVS project.

Name	Office	Responsibility	Telephone
Stephen R. Dash	AND-320	IPT Lead	202-493-4651
John Bisaga	AND-320	IPT Member for Engineering	202-493-4784
Susan Hedenberg	ARN-200	IPT Member for AT Requirements	202-493-4793
George Clark	ARN-200	IPT Member for Logistics	202-493-4789
Vinod Bhatnagar	ANS-700	IPT Member for NAS Integration	202-493-4783
Ed Hand	AND-320	IPT Member for Implementation	202-493-4792
Michelle Brune	AND-320	Business Manager	202-493-4788
Jim Blades	AND-320	Contracting Officer	202-493-4785
Tom Culp	ACT-340	IPT Member for Testing	609-485-4396

Table 12-1: ETVS/ AND-320 Integrated Product Team

12.3.3 Program Status Reporting

The contractor will inform the ETVS project manager of the state of the ETVS program via monthly project status reports (ETVS Data Item Description A02). These reports will provide an assessment of the project's progress, any problems encountered since the last report, and expected events scheduled to occur during the next month. In addition, project management reviews will take place quarterly to review technical, schedule and cost aspects of contract performance, project accomplishments (e.g., milestones met), problems, risks, forecasts and subcontractor activities. The project status reports and program management reviews will help to ensure program progress, identify any problems, and provide a forum for the expedient resolution of any problems. Section 13.2.1.1, Implementation Activities, provides more detailed descriptions of the various meetings, reviews, and audits to be conducted in support of ETVS implementation. (Source: ETVS Statement of Work, 8/9/94, para 3.1.2, 3.3.2)

12.3.4 Exception Management

It is the intention of the ETVS project management that there be a free exchange of ideas between the contractor and the government at all technical reviews, audits, and Technical Interchange Meetings (TIMs) in order to establish program progress, identify resolve issues. TIMs may be held at the request of the government or the contractor to discuss in detail any

technical or National Airspace Integrated Logistics Support (NAILS) issues that require resolution or further clarification. (Source; ETVS Statement of Work, 8/9/94, para 3.3.5)

Implementation and transition issues will be identified during Transition Information Exchanges (TIEs). The TIE provides an opportunity for review of implementation information and identification and resolution of issues as early in the acquisition cycle as possible. TIEs are conducted by the Integrated Product Team - Lead (IPT) or the NAS Implementation Specialist for ETVS during each phase of the acquisition cycle before implementation can proceed to the next acquisition phase. Resolution of implementation issues identified during a TIE are incorporated into the Project Implementation Plan (PIP) issued during the subsequent phase. (Source: Implementation Process Guidelines, 10/93, para 2.5)

12.4   Quality Assurance

The contractor for the ETVS program will establish and maintain a Quality Control Program in accordance with FAA-STD-016A, Quality Control Systems Requirements, and the contractor's Quality Control System Plan (QCSP). The QCSP describes the contractor's plans for quality control, inspection, and test of all materials to be supplied under the ETVS program. (Source: ETVS Statement of Work, 8/9/94, para 3.8.)

12.4.1 Program Acceptance Criteria

Performance measures will be detailed in the monthly progress status reports given by the contractor to the government (see paragraph 12.3.3, Program Status Reporting). A cost status report will be required of the vendor if the option to modify ETVS voice switching equipment to meet P^3I requirements is exercised. (Source: ETVS Statement of Work, 8/9/94, para 3.1.2)

12.4.2 Risk Management

The risk management process involves identification, analysis, evaluation, mitigation, and monitoring risks associated with the implementation of the ETVS project. Risk management begins with the identification of risks to the program. Risk areas to be assessed include technology, design and engineering, support, manufacturing and production processes, producibility, cost, and schedule. Risks can be identified through any source providing insight into the program.

Once a risk has been identified, documented, and reported to management, the risk is assigned by the relevant Associate Program Manager to an actionee, who will perform a risk analysis. The analysis will assist in determining the cause, effects, and magnitude of the perceived risk, as well as helping to develop and examine alternative options.

Approaches to risk mitigation, which follows identification, analysis, and evaluation, are based on trade-offs between relevant factors (level of risk, available alternatives) and supporting data, such as cost, trends, historical information, and environments. Risk mitigation will be accomplished by avoidance, transfer, control, and acceptance. Once a risk is identified, analyzed, and ranked, a mitigation plan is prepared.

When the mitigation plan is completed, the analysis finding along with the recommended mitigation plan is forwarded to the Risk Evaluation Board for evaluation and approval. The

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matrix team will establish a schedule and assign responsibility to the appropriate organization for implementation of the plan. The ETVS Program Office will notify the contractor of all identified risk items that are applicable to the contractor for mitigation. The contractor will then report to the Program office the status of the risk reduction activities during each program management review or as required.

Once a risk mitigation plan has been established, accurate documentation and continued evaluation are important to assure that 1) the expected results are obtained, 2) factors attendant to the risk have not changed, and 3) no new risks have been introduced. (Source: ETVS Risk Management Plan, 2/11/94)

12.5   Configuration Management (CM)

12.5.1 CM Responsibilities

Configuration management procedures are prescribed by FAA Order 1800.8F, National Airspace Configuration Management. The contractor will establish, implement, and maintain a formal Configuration Management (CM) program on all hardware and software configuration items of the ETVS in accordance with the provisions of MIL-STD-973. The contractor will specify an individual who shall serve as a single point of contact for all CM related issues.

The contractor will implement and maintain configuration control over work performed by subcontractors and vendors in accordance with the requirements of MIL-STD-973. The contractor will detail the procedures for monitoring the subcontractor effort in the configuration management plan. (Source: ETVS Statement of Work, 8/9/94, para 3.2)

Configuration Management Plan The contractor will develop a single Configuration Management Plan (CMP), Data Item Description B01, addressing both hardware and software in accordance with Appendix A, MIL-STD-973. The plan will describe in detail the CM methodologies for baseline identification and control, status accounting and auditing of software, hardware, firmware, documentation, and support equipment including any automated tools. Procedures specifying the techniques and identifying the steps and forms required to accomplish CM activities will be provided. The CMP will detail the contractor's internal interface responsibilities with program management, systems engineering, Quality Assurance (QA), Test and Evaluation (T&E), logistics, training, and site installation activities. The CMP will address configuration audit planning and procedures. (Source: ETVS Statement of Work, 8/9/94, para 3.2)

Configuration Control The contractor will develop and implement detailed procedures by which configuration control is accomplished. The contractor will extend configuration control to cover hardware, software, firmware, and documentation. The contractor will establish a Configuration Control Board (CCB) to support baseline management. The contractor will maintain traceability and currency of the baseline and consistency among all project documentation, hardware, software, firmware, and documentation and their respective versions. The contractor will provide and install any hardware, software, and firmware updates to all previously delivered, undelivered, and future ETVS sites.

Changes to the approved baseline will be submitted to the Contracting Officer in accordance with Appendix D and E, MIL-STD-973, as applicable, relating to Engineering Change Proposals (ECPs) and/or Request for Deviation/Waivers. In addition, the contractor will submit Design Change Notices to implement approved ECPs into provisioning technical documentation. The technical data documentation package will be updated to reflect approved changes. Either the contractor or the government may initiate a change to a proposed or approved baseline. (Source: ETVS Statement of Work, 8/9/94, para 3.2.1)

Configuration Status Accounting (CSA). The contractor will generate Configuration Status Accounting Reports (CSAR), Data Item Description B06, to ensure that delivered documentation accurately describes and represents the ETVS hardware and software configurations. The contractor will document the configuration identification and will determine the status of engineering changes, deviations, and waivers with status accounting reports in accordance with Appendix H, I, and J, MIL-STD-973. The reports will include all data to provide traceability of any change for the entire CM life cycle and will be delivered in hard copy. The contractor will describe the tools to be used to accomplish status accounting in the CMP. (Source: ETVS Statement of Work, 8/9/94, para 3.2.2)

12.5.2 Configuration Control Boards (CCBs)

The AND-1 Configuration Control Board (CCB) controls the requirement for changes to project hardware and software baselines during the acquisition phase. After the ETVS system becomes fully operational, configuration management responsibility will transition from AND-300, Communications and Aircraft Acquisition, to AOS-510, Communication Support Engineering Branch. Approval authority for all ETVS modifications will shift from the AND-1 CCB to the maintenance engineering CCB at the same time. (Source: ETVS Integrated Logistics Support Plan, 2/18/94, para 10.4)

12.5.3 CM Milestones

Table 12-2 contains a list of significant ETVS configuration management milestones.

Configuration Management Milestones	Actual/Projected Schedule
ETVS Specification Published	July 1994
Contract Award	July 1995
OT&E Completed	April 1998
Physical Configuration Audit	June 1998
IOT&E Completed	August 1998
Y2K Compliance Certification	August 1998
System Change Notice (SCN-5)	(Prior to ISD)
In-Service Decision (ISD)	October 1998

Table 12-2: Configuration Management Milestones

12.5.4 Configuration Items

The contractor will select configuration items in accordance with MIL-STD-973. The contractor will implement and maintain a system to identify, label, serialize, and mark both Hardware Configuration Items (HWCI) and Computer Software Configuration Items (CSCI) such that traceability is maintained between all representations of that item throughout the entire CM life

cycle. The configuration identification will be documented in the product baseline. (Source: ETVS Statement of Work, 8/9/94, para 3.2.2, 3.3.1.1)

12.6-12.19   Reserved

12.20 Status Assessment

The ETVS program is similar to other replacement or upgrade projects and, therefore, does not place any additional or unusual administrative or program management requirements on the FAA. No program management risks have been identified to date.

13.0   IMPLEMENTATION (REQUIREMENTS)

13.1   Implementation Support Organization

13.1.1 Associate Product Lead for NAS Implementation (APLNI)

The APLNI is the ANS-700 person assigned to lead a NAS Implementation Team and to represent ANS-700 as a core member of the Product Team. The APLNI for ETVS is Vinod Bhatnagar. His phone number is (202) 493-4783. (Source: Implementation Process Guidelines, 2/97 Appendix B)

13.1.2 Field Level Involvement

The Voice Switch and Recording Integrated Product Team (IPT) briefed the regions on Implementation requirements at a National Conference held in Denver, Co in March, 1997. Attendees at the conference included representatives from the regions and AND, ANS, AML, ARN and Implementation Managers from the equipment contractors. In addition, the IPT conducts a monthly national teleconference (Telecon) to provide regions with program status and discuss Implementation issues.

13.1.3 Regional Associate Program Manager (RAPM)

The primary point of contact in the regions for implementation is the Regional Associate Program Manager (RAPM). The RAPM is now assigned to the recently formed ANI organization. However, the RAPM remains the working coordinator for their region in matters pertaining to implementation of assigned programs. The RAPM interfaces with all concerned regional offices and is the regional liaison for ETVS activities. The RAPM will:
- Represent the regional Airway Facilities (AF) Division in identification and resolution of ETVS issues;
- Interface with the headquarters, other regions, the FAA Technical Center, and the FAA Aeronautical Center to coordinate scheduling, planning, installation, and testing;
- Coordinate with regional divisions/facilities on ETVS activities;
- Coordinate the review of ETVS documentation by regional personnel; and,
- Coordinate distribution of funding within the region for the ETVS project.

Table 13-1 lists the names and phone numbers of the ETVS RAPMs.

13.1.4 Technical Onsite Representatives (TOR)

A TOR will be appointed to witness and participate in the installation, integration, and verification activities at each ETVS site. TORs will be assigned by the region after the ETVS delivery schedule has been finalized. The ETVS delivery schedule is expected to be finalized shortly after the In-Service Decision which is expected in October, 1998. The TOR will:
- Serve as the focal point for all matters pertaining to site installation activities;
- Identify and coordinate with personnel participating in site preparation and installation;
- Provide installation personnel with access to the site;
- Ensure that contractor installation procedures meet FAA standards;

- Inform the region whenever technical and contractual issues are identified;
- Inform the region on the status of site preparation, equipment deliveries, and installation progress;
- Identify power and grounding connection points, internal facility cable raceways, and buried or hidden utility conduits that would affect the installation effort; and,
- Assist in verification of proper performance of the ETVS during site testing.

Name	Routing Symbol	Region	Telephone
Ed Davis	ANI-140	New England Region	781-238-7435
Steven LoVerde	ANI-240	Eastern Region	718-553-3469
Terri Simpson	ANI-340	Southern Region	404-305-6294
Neil Angelotti	ANI-440	Great Lakes Region	847-294-7584
Doug Edwards	ANI-540	Central Region	816-426-2242
Ana Gonzalez	ANI-640	Southwest Region	817-222-4213
Mel Leskinen	ANI-740	Alaskan Region	907-271-5199
Mark Stack	ANI-840	Northwest Mountain Region	425-227-2435
Gary Pettengill	ANI-940	Western Pacific Region	310-725-3495

Table 13-1: Regional Associate Program Managers (RAPMs)

13.1.5 Contract Support

Denro, Inc of Gaithersburg, MD will install the ETVS equipment at each site. Local and regional contractor support for site preparation will be secured as needed by the regions. Regions will provide any funding required for contractor labor during site preparation.

13.2   Site Implementation Process

The Site Implementation Process involves seven phases, these phases are discussed in this section. The seven phases are: 1.) Implementation Planning, 2.) Site Preparation, 3.) Installation and Checkout, 4.) Integration, 5.) Field Shakedown, 6.) Dual Operations, and 7.) Equipment Removal.

13.2.1 Planning Phase

13.2.1.1 Implementation Activities

13.2.1.1.1 Voice Switching Regional Meetings

AND-320 sponsors an annual voice switching regional meeting in various locations with regional representatives to collect and disseminate information and resolve voice switch implementation issues. These meetings are announced in advance by memorandum. Due to budget constraints, there will not be an annual meeting in 1998.

13.2.1.1.2 Airway Facilities Requirements Management Team (AFRMT)

Prior to re-organization into ARN-200, the Communications Life-Cycle Division, ALM-700, conducted an Airway Facilities Requirements Management Team (AFRMT) meeting to discuss and resolve maintenance, training, and other logistics issues. The first ETVS AFRMT was held

in January 1996 at Andrews Air Force Base, Maryland. The AFRMT provided a means for coordinating, monitoring schedules and contract performance, and assessing NAILS program progress. Future NAILSMT meetings may be held at the vendor's facility or at government facilities as ordered by the government. (Source: ETVS Statement of Work, 8/9/94, para. 3.6.1.2.2)

13.2.1.1.3 FAA Site Survey

The purpose of the FAA site survey is to identify the level of site preparation required and to collect worksheet information to be submitted to AND-320. The FAA site survey will be conducted jointly by the appropriate ANI-X40 and AXX-500 branches of the region responsible for the site. The site survey will require the verification of site drawings and the completion of worksheets to be provided to the equipment vendor. Upon completion of the site survey materials, ANI-X40 and AXX-500 will meet with the TOR, local air traffic, and airway facilities personnel to finalize the survey materials. The survey and updated site drawings will then be forwarded to AND-320 and the region can initiate engineering and site preparation activities. Data to be furnished for the site survey will include:

- Number of operator positions;
- Number and type of each telephone circuit (for G/G communications) to be connected to the ETVS;
- Other G/G circuits to be connected to the ETVS (e.g., direct lines to fire and rescue, door intercom, ATS trunks);

Number and configuration of A/G frequencies to be connected to the ETVS;

Assignment of circuits and frequencies to positions;

Assignment of certain special features (e.g., monitoring) to positions;

Identification of any reserve power system requirements;

Number of headsets, handsets, and microphones;

Facility layout information, including location reserved for ETVS equipment; power, grounding, communications line attachments, and cabling routes; and,

Name and telephone number of site TOR, if available, or else the name and telephone of a regional representative with whom implementation issues may be coordinated until a TOR is named.

13.2.1.1.4   Contractor's Site Survey

The purpose of the contractor site survey for ETVS is to identify the baseline system configuration for the site. This information will be confirmed by the program office, and will be used in constructing and assembling an appropriate system for the site. As ordered by the program office, the contractor will conduct the site survey, under supervision of the appropriate ANI-X40 and AXX-5AA divisions. The site survey will require the verification of site drawings and the completion of worksheets. Upon completion of the site survey materials, the contractor will prepare a site survey report. The survey report will be forwarded to the respective region and AND-320 for approval no later than 30 days after completion of the site survey. The site survey report will include the following:

Floor space and floor loading to accommodate the equipment;

Heating, air conditioning, humidity, and environmental requirements;

Electrical power, outlets, and lighting requirements;

Line circuits and interface requirements;

Storage, work area, and telephone requirements;
Location of failure alarms;
Coordination of site security requirements;
Identification of special site conditions by the FAA, Telco, OCC, etc.;
Location and emplacement of demarcs;
Cabling and runways for power and communications circuits;
Plant-in-place (emplacement) floor plans or drawings;
Special cable harnesses required to interconnect equipment;
Facility modification or construction requirements;
Work hour restrictions;
Conflicts with the specification or SOW caused by this site;
Installation materials list;
Adequacy of single and multipoint grounding systems;
Loading zone, dock, and ramp location and ability to accommodate delivery vehicles;
Requirements for special or heavy duty equipment such as dollies, trolleys, or forklifts; and,
Corridor, doorway, and equipment room clearances to permit equipment movement through the
facility. (Source: ETVS Data Item Description E03, 4/1/94, para 10.1)

Comments to the site survey report should be submitted to the program office by the regions
within 30 days of receipt of the survey report. Upon receiving the comments, AND-320 will
initiate the order for the necessary equipment. Site survey report comments will be forwarded to
the ETVS contractor, who will include them in a site specific Site Installation, Integration, and
Acceptance Test Document (SIIATD) (CDRL E02a).

13.2.1.2 Requirements

13.2.1.2.1 Deployment Readiness Review (DRR)

The Deployment Readiness Review (DRR) has been discontinued. In its place the IPT has
completed an In-Service Decision (ISD) Checklist Report for ETVS to ensure the ETVS
program is ready for integration into the NAS. This report also ensures that the FAA is ready to
receive, utilize, and provide life-cycle support for ETVS.

13.2.1.2.2 Human Resources

An FAA site survey, conducted at an ETVS site, will require the completion of worksheets to be
provided by the ETVS vendor as part of the Site Installation Management Plan (SIMP). The site
survey will require approximately two days to complete, and will require the participation of
regional Facilities and Equipment (F&E) (ANI-X40) and Air Traffic (AXX-5XX) personnel, and
the TOR. The contractor site survey will require ANI-X40 personnel oversight.

13.2.2 Site Preparation Phase

13.2.2.1 Implementation Activities

The ETVS site preparation phase includes those activities that must be completed before
equipment delivery. Site preparation involves repairs, refurbishment, and other actions
necessary to make the site ready to accept installation of the new equipment.

13.2.2.1.1 Site Preparation Tasks

The region is responsible for managing the engineering and accomplishing the site preparation as outlined in the subparagraphs below. The region will be responsible for:

- Determining material shortfalls based on review of ETVS Project Material List (PML) data and generating project status reports. Project specific Project Status Reports (PSRs) will be established as required by the regional F&E personnel. In order to establish a material requirements baseline, a PML for the ETVS will be loaded into the FAA Logistics Center resident Project Material Management System (PMMS). Any shortfalls in material needs for regions and individual existing sites will be determined from PMMS data. Because the ETVS is a turnkey procurement, the PML is expected to consist of the basic equipment only. PSRs will be initiated as required following review of the PML data by regional and site F&E personnel;
- Providing necessary floor space for ETVS installation;
- Providing, where possible, an individual AC power distribution panel solely for the ETVS equipment. Main power to the ETVS will require separate breaker(s). Power for backroom convenience outlets will be provided as standard 110 V, 60 Hz power;
- Ensuring adequate electrical grounding in accordance with FAA-STD-019B, Lightning Protection Grounding, Bonding, and Shielding, and FAA-STD-020, Transient Protection, Grounding, Bonding, and Shielding, by conducting a comprehensive grounding survey and making necessary upgrades or replacements;
- Providing a signal ground plate (single-point ground) and a chassis ground plate (multi-point ground) for the ETVS equipment;
- Ensuring that common carriers (i.e., telephone companies) have installed suitable signal grounds for each incoming telephone circuit (to avoid ground potential differences between ETVS and the telephone circuits, the carrier ground should be connected to the ETVS signal ground);
- Ensuring adequate primary lightning protection for the facility and for external lines (both telephone company lines and FAA-owned lines) in accordance with FAA-STD-019B;
- Providing workspace for site survey meetings and site preparation activities;
- Ensuring that all communications circuits (telephone lines, local connections for direct line or air-ground communications, etc.) meet the requirements of the ETVS transmission plan; and,
- Providing to the TOR all approved documentation required for implementation, including telecommunications service requests (TSR), site survey reports, instruction books and site installation, integration, and acceptance plans.

13.2.2.2 Requirements

13.2.2.2.1 Financial Resources

Regions must identify funds for those items not covered under the scope of AND-320 site preparation. AND-320 will fund all materials and parts for site preparation. AND-320 will issue project authorizations (PA) for small dollar amounts up to one year prior to installation to formally establish the site preparation effort to which regions may allocate F&E engineering resources. The PA amount is based on the average level of site preparation needed at ETVS

sites. To obtain additional site preparation materials and equipment funding, regions must submit detailed site-specific cost estimates to AND-320. Site preparation funds provided by AND-320 are intended for the materials listed in Table 7-1, Intended Uses for Site Preparation Funding.

Site preparation funding is not intended to be used for items such as omnibus support contract labor costs, grounding upgrades to facilities (e.g., ground plane installation, counterpoise), cab modernization costs (e.g., painting, carpeting, patching/grouting, air conditioning), or Telecommunications Management and Operations (TM&O) costs (e.g., circuit re-termination, leased voice switch removal).

13.2.2.2.2 Human Resources

Site preparation tasks will be completed by ANI-X40 F&E personnel. The number of personnel and the amount of time required to complete site preparation tasks will depend on the difference between the required physical site condition and actual physical site condition. It is estimated that completion of site preparation work at the average ETVS site will require the involvement of two ANI-X40 personnel for two months. A more accurate estimate of personnel and time requirements at each site will be possible after completion of the site survey.

13.2.2.2.3 Physical Facility and Equipment Attributes

The amount of site preparation work required will depend on the difference between the required physical site condition and actual physical site condition. Facilities that meet current FAA standards will require less modification. All facilities will need to add, as a minimum, an individual AC power distribution panel solely for the ETVS equipment (where possible); a separate breaker(s) for ETVS main power (critical power); a signal ground plate and a chassis ground plate for the ETVS equipment; and standard (non-critical) 110 V, 60 Hz power for backroom convenience outlets. More specific site preparation and installation requirements will be identified after completion of site survey worksheets.

13.2.3 Installation and Checkout Phase (INCO)

13.2.3.1 Implementation Activities

 The installation and checkout phase for the ETVS includes equipment delivery to the site, installation, integration, checkout, and site acceptance testing. The ETVS vendor will conduct site verification at each site, including site acceptance testing, to ensure that equipment is correctly installed and configured, fully operational, and ready for transfer to the government. Site verification will be conducted according to test procedures published in the Contractor's Master Test Plan (CMTP) and the site-specific SIIATD in the presence of the TOR and other government representatives as designated. The Installation and Checkout Phase will end with completion of the Contract Acceptance Inspection (CAI), which is the formal acceptance by the FAA of the ETVS system from the contractor.

13.2.3.1.1 ETVS Delivery

The subparagraphs below identify the responsibilities of the ETVS vendor and the TOR for system delivery.

ETVS vendor responsibilities The vendor will:

- Contact the TOR or other designated ANI-X40 representative by letter to request a suitable date and time for delivery, and to obtain delivery instructions;
- Provide names of installation team members and identify requirements for parking;
- Assemble and pack all ETVS material and equipment in accordance with the contract and ship it from the vendor's facilities to each designated ETVS facility;
- Unload all ETVS material and equipment and place it (if necessary) into temporary storage at the ETVS facility (i.e., at the loading dock);
- Move all ETVS material and equipment to the installation area designated by the TOR;
- Unpack, inspect, inventory, and secure all ETVS material and equipment to make it ready for installation;
- Provide all personnel and equipment (including vehicles, hand trucks, dollies, tools, etc.) needed to carry out the above items; and,
- Dispose of all packing materials and other waste in accordance with the instructions of the TOR.

FAA responsibilities The site TOR or other ANI-X40 personnel will:

- Coordinate date and time of delivery with vendor, and provide delivery instructions;
- Ensure that site survey activities are complete in accordance with paragraph 13.2.2.1.1/2;
- Arrange off-loading facilities for ETVS material and equipment deliveries;
- Arrange parking for installation team vehicles;
- Ensure that equipment can be moved directly to installation area, or if not, arrange for temporary storage space; and,
- Identify delivery routes within the ETVS facility to the installation areas and arrange for necessary facility access for installation team members.

13.2.3.1.2   ETVS Installation

The subparagraphs below identify the responsibilities of the ETVS vendor and the TOR for system installation. Detailed installation procedures will be identified in the SIIATD, CDRL E02.

ETVS vendor responsibilities. The ETVS vendor will:

- Connect equipment to the appropriate power service(s) and facility ground as instructed by the TOR;
- Install all system wiring, including intra-building cable runs;
- Connect external interfaces (e.g., telephone lines);
- Affix labels, signs, or other identifiers as required for the use of operators and maintainers;
- Supply all tools, equipment, and materials needed to accomplish the tasks in subparagraphs above;
- Minimize disruption to other facility construction efforts or ongoing government operations; and,
- Arrange for disposal of packing materials and other waste.

TOR responsibilities For site verification, the designated TOR will:

- Review and approve contractor test plans and procedures;
- Ensure that vendor has made sufficient effort to minimize the impact of site verification on ATC facility operations;
- Participate in and observe site verification activities;
- Ensure that test failures are analyzed, that necessary corrections are made, and that re testing is completed; and,
- Record all data necessary for completion of further site verification activities.

13.2.3.1.3 ETVS Verification

The subparagraphs below identify the responsibilities of the ETVS vendor and the TOR for system verification (i.e., Site Acceptance Testing). Detailed verification procedures will be identified in the site-specific SIIATD, CDRL E02a..

ETVS vendor responsibilities. For site verification, the ETVS vendor will:

- Develop test scenarios and procedures and publish them in the SIIATD for government approval;
- Provide all equipment, software, tools, test equipment, and emulation equipment (i.e., for external interfaces) required for site verification;
- Conduct all site verification activities in the presence of the TOR or other designated government personnel; and,
- Log all test results and produce test reports in accordance with the ETVS contract.

TOR responsibilities. For site verification, the designated TOR will:

- Review and approve contractor test plans and procedures;
- Ensure that the vendor has made sufficient effort to minimize the impact of site verification on ATC facility operations;
- Participate in and observe site verification activities;
- Ensure that the test failures are analyzed, that corrections are made, and that re-testing is completed; and,
- Record all data necessary for completion of further site verification activities.

13.2.3.1.4 Contract Acceptance Inspection (CAI)

The Contract Acceptance Inspection (CAI) is the acceptance by the FAA of the ETVS from the contractor. The CAI will be conducted by the designated Technical On-site Representative (TOR) after completion of the Site Acceptance Test. A pre-CAI punch list will be developed by the TOR with the assistance of Regional AF Maintenance personnel. This punch list will identify corrective actions which should be taken by the contractor before the ETVS is accepted by the FAA and will help prevent exceptions on the Joint Acceptance Inspection (JAI). ANI-X40, or other regional F&E representative, will have all discrepancies identified prior to the JAI. (Source: FAA Order 6030.45A, 11/24/93, p.403)

13.2.3.1.5 Facility Reference Data File (FRDF)

The Facility Reference Data File (FRDF) is a file of technical reference data on the characteristics and performance of all FAA maintained or FAA owned facilities. The FRDF serves as an historical record of facility and equipment performance and is used to facilitate day-to-day, periodic, and corrective maintenance activities, technical inspections, management evaluations, and aircraft accident/incident investigations. Regional AF personnel are responsible for updating the FRDF to accurately reflect changes in equipment configuration at a facility, such as after the addition of new equipment. An FRDF section must be established for the ETVS and contain, as a minimum, copies of the CAI and JAI reports, any NAS Change Proposals (NCPs) and Configuration Control Decisions (CCDs) necessitated by ETVS implementation, a list of available equipment drawings, a list of ETVS technical instruction books, and a list of applicable test data documents provided by the ETVS contractor. Equipment drawings, technical instruction books, and test data documents should be readily accessible, but need not be physically included in the FRDF. The FRDF should be updated throughout the installation and testing of the ETVS to ensure that the commissioning requirement for an accurate FRDF is met. (Source: FAA Order 6030.45A, 11/24/93, p.320)

13.2.3.2 Requirements

13.2.3.2.1 Financial Resources

The program office will provide funding to support AND-320 participation in installation and checkout activities (i.e., site acceptance testing oversight). Regional Facilities and Equipment (F&E) and Regional AF Maintenance personnel participation will be funded by the region.

13.2.3.2.2 Human Resources

For the first ETVS installation only, a representative of AND-320, FAA Technical Center, Automation Division, will serve as TOR and will perform the duties listed above in subparagraph 13.2.3.1.2, ETVS Installation. The program office, AND-320, will provide technical support to the regions for site verification, including training and orientation, and provision of technical data. Regions may request AND-320 support for site acceptance testing at sites with special requirements to help expedite successful test completion and acceptance.

13.2.3.2.3 Physical Facility and Equipment Attributes

All site preparation work should be completed prior to equipment delivery to the site. The only required facility modifications by the installation and checkout phase will be emplacement of system wiring, including intra-building cable runs. These modifications will allow connection of ETVS equipment to facility power supply, grounding network, and external interfaces (e.g., telephone lines).

13.2.4 System Integration Phase

13.2.4.1 Implementation Activities

After successful completion of site acceptance testing at the first field site and the system has been formally accepted from the contractor by the FAA (Contract Acceptance Inspection, CAI), AND-320 will perform NAS Operational Test and Evaluation (OT&E)/Integration and

OT&E/Operational testing. The System Integration Phase of site implementation will end with FAA Regional AF Maintenance declaration of the Initial Operating Capability (IOC).

13.2.4.1.1 OT&E/Integration and OT&E/Operational Testing

OT&E/Integration and OT&E/Operational testing will be performed at the FAA Technical Center and the first field site (please refer to section 9.1.1, Government Test Program, for a more detailed description of OT&E/Integration and OT&E/Operational testing). The purpose of integration testing is to ensure that the ETVS will operate effectively with the variety of external equipment to which it will be connected. Operational testing will verify the operational effectiveness and user suitability of the ETVS. Although it is not anticipated at sites other than the FAA Technical Center and the first field site, some OT&E/Integration or OT&E/Operational testing may be required at subsequent ETVS sites if interfaces or configurations at those sites cannot be duplicated at the Technical Center. The ETVS vendor generally will not be involved in NAS OT&E/Integration or OT&E/Operational testing, although there are provisions in the ETVS contract for the vendor to provide limited engineering support as may be required.
For NAS OT&E/Integration and OT&E/Operational testing, ACT-340 will:

- Ensure that all necessary equipment, tools, and emulation equipment are available;
- Ensure that the impact of testing on ATC facility operations is minimized;
- Develop Operation Test and Evaluation (OT&E)/Integration and Operational Test Plan which provides procedures to verify the user requirements from the FAA Test and Evaluation Master Plan (TEMP). This test plan will contain the approach to testing, requirements to be tested, management of the test, scheduling information, and resources required to test. The test plan is expected approximately six months prior to the start of OT&E/Integration testing at the FAA Technical Center or first field site; (ETVS TEMP, 4/26/94, 3.3.1.2)
- Conduct testing, assisted by other government personnel as required;
- Ensure that test failures are analyzed, that necessary corrections are made, and that retesting is successfully completed; and,
- Report NAS integration test results.

13.2.4.1.2 Initial Operating Capability (IOC)

The System Integration Phase of site implementation will end with FAA Regional AF Maintenance declaration of the Initial Operating Capability (IOC), which defines the point at which ETVS equipment installation and testing have been completed and have met the requirements of the ETVS specification. (Source: FAA Order 6030.45A, 11/24/93, Appendix 1, 15.)

13.2.4.2 Requirements

13.2.4.2.1 Financial Resources

Funding for travel and per diem expenses to support AOS-510 and AND-320 system integration activities at the FAA Technical Center will be provided by the program office. The program office will also fund AND-320 and AOS-510 personnel should NAS OT&E/Integration or OT&E/Operational testing be required at subsequent sites. Regional Associate Program Manager (RAPM), Facilities and Equipment (F&E), Regional AF Maintenance, and Air Traffic (AT) personnel participating in OT&E/Integration and OT&E/Operational testing at the FAA

Technical Center will have their travel and per diem expenses funded by the program office. At subsequent sites requiring OT&E/Integration or OT&E/Operational testing, however, participation by regional personnel will be funded by the regions.

13.2.4.2.2 Human Resources

AND-320 and AOS-510 representatives will support ETVS OT&E/Integration and OT&E/Operational testing at the FAA Technical Center. Program office representative(s) will support ETVS system integration activities at subsequent sites as required. AND-320 representatives will attend OT&E/Integration and OT&E/Operational testing to expedite successful test completion and acceptance. The RAPM, two regional F&E representatives, one SM representative, and two regional AT representatives will support system integration activities at each site.

13.2.4.2.3 Physical Facility and Equipment Attributes

All site preparation and equipment installation work should be completed prior to the beginning of system integration testing. No facility modifications should be required by the system integration phase of ETVS implementation.

13.2.4.1 Implementation Activities

13.2.5 Field Familiarization Phase

13.2.5.1 Implementation Activities

The Field Familiarization Phase starts after the Initial Operation Capability (IOC) decision that determines that the ETVS installation and testing have been completed and meet defined requirements. Following shakedown testing, the ETVS can be "cut over" into operation for use in controlling live air traffic. The Field Familiarization Phase will end upon successful completion of the final Joint Acceptance Inspection (JAI) by the appropriate Airway Facilities and Air Traffic personnel and declaration of Operational Readiness.

13.2.5.1.1 OT&E/Shakedown Testing

For the first ETVS field site (not the FAA Technical Center), or other designated key site, Communications System Engineering Branch, AOS-510, will, at the request of the AND IPT Lead for Voice Switching and Recording, perform NAS Operational Test and Evaluation (OT&E)/Shakedown testing on an ETVS that has successfully passed site verification. OT&E/Shakedown testing is similar to OT&E/Operational testing, but is performed at the site where the ETVS equipment will actually be used. Shakedown testing will ensure that the ETVS performs reliably, meets operational requirements, and can be maintained under actual ATC facility working conditions. The ETVS vendor generally will not be involved in shakedown testing, although there are provisions in the ETVS contract for limited engineering support as may be required. Field shakedown testing, similar to the OT&E/Shakedown testing conducted at the first ETVS field site, will be performed at all subsequent sites by ANI-X40 personnel. For shakedown testing it is expected that AOS-510 will:

- Ensure that all necessary equipment and tools are available;
- Ensure that the impact of testing on ATC facility operations is minimized;

- Develop an OT&E/Shakedown Test Plan. This test plan will contain the approach to testing, requirements to be tested, management of the test, scheduling information, and resources required for the test. The shakedown test plan is expected approximately six months prior to the start of OT&E/Shakedown testing at the first field site; (ETVS TEMP, 4/26/94, 3.3.1.3)
- Ensure adequacy of shakedown prerequisites such as operator and maintenance training, availability of spares, special tools, and test equipment, etc.;
- Conduct tests, assisted by other government personnel as required;
- Ensure that test failures are analyzed, that necessary corrections are made, and that retests are successfully completed; and,
- Report shakedown test results to the AND IPT Lead for Voice Switching and Recording.

13.2.5.1.2 ETVS Cutover

In the majority of cases, ETVS cutover can be performed as a "hot" cutover (i.e., no transition switch will be used). The ETVS, once installed and cutover, will provide all voice switching functionality. Cutover is planned by regional AF (ANI-X40) personnel based on standard regional cutover procedures, site-specific requirements, and coordination with local AT personnel. Since every site in every region will be unique, ever cutover will be unique. Cutover at each site will be planned and conducted in such a way that it minimizes the impact of any temporary loss of AT communications assets. Cutover will also be planned to minimize the amount of disruption in operational areas due to cutover activities. Disruption can include noise generated by tools and cutover personnel, temporary placement of cutover tools and materials, and the presence of cutover personnel in operational areas.

Personnel requirements to support ETVS cutover will be determined by Regional F&E (ANI-X40) personnel on a site-by-site basis. Larger systems will require greater participation by regional and site AF personnel. AND-320 support of cutover activities at sites with special requirements can be coordinated through the ETVS Program Office. For the first site in each region, contractor system cutover support will also be provided by AND-320. Additional contractor cutover support for special situations can be requested of AND-320.

The ANI organization has instituted a 'Lessons Learned Communications Network'. The ANI Terminal Manager, ANI-40, conducts biweekly telecons with representatives from each Implementation Center to discuss issues with the terminal facilities' automation and communications switching programs. These telecons are held at 2:00PM (Eastern Time) every other Tuesday. In addition, AND-320 holds monthly telecons where the regions can discuss issues related to ETVS implementation and cutover.

Cutover Planning Meeting A cutover planning meeting will be conducted prior to start of the cutover to coordinate cutover plans with local AT personnel to minimize any operational impact at the facility. Site specific cutover plans will be discussed, including a schedule of cutover activities, a discussion of any possible interruption to AT communications capabilities, and a discussion of the amount of extra foot traffic and noise in operational areas. Operator positions not used during peak operational hours should be identified and plans for early installation in permanent location should be coordinated with local AT personnel. This can reduce the amount

of work required during at the time of the actual cutover. Regional F&E (ANI-X40) personnel will lead the meeting, with participation from the ETVS TOR and local AF and AT personnel. Any AND-320 or contractor personnel supporting cutover at the site will attend the meeting as well.

Pre-Cutover Activities All cutover-related preparation should be completed prior to the start of cutover to ensure that the cutover can proceed in a timely manner. Preparation may include the following:
- Ensuring all tools required for cutover are present and in good working order (e.g., electric screwdriver batteries are fully charged, ladders and flashlights are available);
- All panel cutouts are complete and panels are located in an easily accessible area;
- All ETVS position equipment has been removed from any temporary mounting frames and is ready to be installed in permanent location; and,
- Any position equipment to be installed at positions normally not used during off-peak hours (as directed by local AT) has been installed and tested.

Cutover Outbrief A cutover outbrief will be conducted to apprise local AT and AF personnel of the status of ETVS operation at the end of formal cutover activities. These briefings should center on any operational impacts that arise from ETVS cutover and provide a summary of the cutover activities performed since the last cutover briefing. Informal daily cutover briefings can be held with local AT supervisory personnel to discuss any operational issues left open at the end of each day's cutover activities. The Cutover outbrief will be conducted by the site TOR with participation of cutover team members and local AT and AF personnel.

13.2.5.1.3 Joint Acceptance Inspection (JAI)

The Joint Acceptance Inspection (JAI) is an activity intended to gain consensus of all involved groups that installation and testing of the ETVS have been completed in accordance with national criteria and that the ETVS is capable of performing its required functions. The Contract Acceptance Inspection (CAI) is the acceptance of the ETVS from the contractor by the FAA. The JAI is the acceptance of the ETVS for maintenance and operation by the using organizations (i.e., Air Traffic, Airway Facility). As an integral part of the overall JAI, an Operational Readiness Demonstration (ORD) will be conducted. Conduct of JAI will be the responsibility of Regional F&E personnel (ANI-X40), with involvement of local AF and AT personnel. (Source: FAA Order 6030.45A, 11/24/93, p.403, FAA Order 6020.2A, 3/28/74, 5.b)

13.2.5.1.4 Operational Readiness Demonstration (ORD)

The Operational Readiness Demonstration, a part of the Joint Acceptance Inspection described above, is a formal demonstration that the ETVS is ready to support real-time air traffic control communications tasks. The ORD demonstrates the readiness of personnel, procedures, hardware, software, and support services. The ORD will examine the following operational, maintenance, and engineering areas:
- Final refinement of operating procedures, methods, adaptation, and parameters;
- Demonstration of all aspects that involve actual control of air traffic prior to commissioning;
- Verification that ETVS equipment documentation accurately describes the system installed at the facility at the time it becomes operational;

- Verification that sufficient staffing exists and that personnel are sufficiently trained and familiar with ETVS functions and equipment; and,
- Verification that required ETVS logistics support capability has been established and that technical logistics data and support material needed for operational use of the ETVS have been furnished. (FAA Order 6020.2A, 3/28/74, 5.b)

13.2.5.2 Requirements

13.2.5.2.1 Financial Resources

Funds provided to AOS-510 by AND-320 will be used to cover travel and per diem expenses incurred during OT&E/Shakedown test performance at the first site. AND-320 will also fund AOS-510 participation in Field Shakedown testing activities at subsequent sites (if required). Regional Associate Program Manager (RAPM), Implementation Center (ANI-X40), and Regional AT personnel required to support shakedown testing, cutover, and JAI activities at the first and any follow-on sites will be funded by the regions. Funding of contractor support for cutover at the first site in each region will be provided by AND-320.

13.2.5.2.2 Human Resources

Shakedown testing will require the involvement of ACT-340, AND-320, and AOS-510 personnel at the first operational (or other designated key) ETVS site. Involvement at the regional level will include the TOR, two F&E, one SM, and two AT personnel. Shakedown testing at subsequent sites will require participation of the ETVS TOR, ANI-X40 personnel, and local AF and AT personnel. Human resource requirements to support ETVS cutover need to be accurately identified for each site to ensure adequate personnel support and minimize operational impact at the site. ETVS cutover support will be determined on a site-by-site basis, but will include as a minimum the ETVS TOR, and ANI-X40 and local AF personnel. Contractor support for cutover will be provided at the first site in each region. AND-320 and contractor support for cutover at subsequent special sites can be requested from the ETVS program office. JAI conduct will require, at a minimum, the involvement of regional ANI-X40 and local AF and AT personnel, as well as the ETVS TOR.

13.2.5.2.3 Physical Facility and Equipment Attributes

All site preparation, equipment installation, and system integration work should be completed prior to the beginning of shakedown testing.

13.2.6 Dual Operation Phase

13.2.6.1 Implementation Activities

The Dual Operations Phase of site implementation begins with certification of the ETVS system and ends with decommissioning of the replaced voice switching equipment. Commissioning, sometimes called operations changeover, represents the formal placement of the ETVS into operational service. The ETVS will not require dual operation of voice switching equipment. The ETVS, once installed and cutover, will provide all voice switching functionality. No backup voice switching capability will be required. The old backroom voice switching equipment may be retained if the facility's Administrative Telephone Service (ATS) is an integral part of this

equipment. In this case, the old backroom equipment can be removed once a new OSTS is delivered, installed, and cutover. Refer to 13.2.7.1, Implementation activities, for further details.

13.2.6.2 Requirements

13.2.6.2.1 Financial Resources

Purchase of an ATS to replace an ATS that is an integral part of a voice switch currently at an ETVS site will be funded by the program office, AND-320.

13.2.6.2.2 Human Resources

If a replacement ATS is required at an ETVS site, human resource requirements will be defined by AND-320. Voice Switching and Recording Engineering Division. No other ETVS human resource requirements are anticipated for the dual operations phase of site implementation.

13.2.6.2.3 Physical Facility and Equipment Attributes

If the site does not have an independent administrative telephone system, one must be procured through the program office. The old voice switch, replaced by the ETVS, will be retained to serve as the interim ATS and will be removed when the OSTS is installed.

13.2.7 Equipment Removal Phase

13.2.7.1 Implementation Activities

13.2.7.1.1 Equipment Removal

None of the replaced equipment will be removed until the ETVS has been installed and cutover. Equipment to be removed includes backroom equipment and position equipment in the tower cab/TRACON control room areas. Removal of backroom equipment may depend on its use as an Administrative Telephone System (ATS) interface. If the current ATS is an integral part of the backroom equipment to be replaced by the ETVS, then its removal will take place after the new ATS, an Operational Support Telephone System (OSTS), has been delivered to the site. If the current ATS is not an integral part of the backroom equipment being replaced by the ETVS, the ATS will be disconnected from the old backroom equipment and connect to the ETVS, allowing the old backroom equipment to be removed. Sufficient lead time should be allotted to process the TSR and permit removal of equipment as soon as possible after the ETVS is commissioned (JAI/ORD). (Source: FAA Order 4800.2B, 10/11/91, 9.b/c)

13.2.7.1.2 Disposal

A disposal plan is being prepared by ARN-200 for the removal and disposition of all replaced equipments. This plan will augment FAA Order 4800.2C, Utilization and Disposal of Excess and Surplus Property.

13.2.7.2 Requirements

13.2.7.2.1 Financial Resources

For voice switches that fall under the "Vintage Voice Switch Program" AOP-500 will fund for the removal of those switches. For voice switches that do not fall under the "Vintage Voice Switch Program" funding is under discussion.

13.2.7.2.2 Human Resources

Equipment removal procedures will be developed by regional AF Facilities and Equipment personnel and approved by Regional AF Maintenance.
Property Disposal Officers (PDOs) in the region are responsible for coordinating the disposal of excess and surplus FAA property with the property manager at the site. (Source: FAA Order 4800.2B, 10/11/91, 22.b)

13.2.7.2.3 Physical Facility and Equipment Attributes

Replaced voice switching will disposed of in accordance with FAA Order 4800.2B.

13.3   Unique Implementation Sites

There are no known sites that will require any notable deviations from the process, requirements and plans as identified in section 13.2.

13.4-13.19   Reserved

13.20 Status Assessment

Funding for non-Vintage Voice Switch Program switches is still being discussed. The initial switches to be placed are in new facilities or facilities having vintage voice switches. The delivery and installation schedule has been established and circulated to the RAPMs. Human resource requirements to support ETVS cutover need to be accurately identified for each site to ensure adequate personnel support and minimize operational impact at the site.

APPENDIX A: GENERIC SITE IMPLEMENTATION PLAN (GSIP)

1.0 INTRODUCTION

1.1 Purpose
The ETVS GSIP is a tool to assist regional and site personnel with developing Site Implementation Plans (SIPs).   This plan is a starting point for identifying activities required for successful implementation of the project at specific locations and identifies organizations responsible for various activities. Additionally, the activity list can be tailored to fit specific needs of Regional and Site personnel and avoid developing each SIP from scratch.

1.2 Scope
The GSIP contains a Project Resource Table that covers the site implementation aspects of the project through the seven phases of implementation. The Implementation Phases covered in the ETVS GSIP include Planning, Pre-Installation and Check-Out (Pre-INCO), Installation and Check-Out (INCO), Integration, Shakedown, and Equipment Removal. The Dual Operations (DUAL-OPS) phase of implementation is not applicable to the ETVS project.

2.0 OVERVIEW

2.1 Responsibilities
The Product Team (PT) is responsible for development of the ETVS GSIP. The Associate Product Lead for NAS Implementation (APLNI) is responsible for coordinating the efforts of the PT.

2.2 Project Resource Table
The ETVS Project Resource Table consists of a broad list of activities required to install a project at a facility. This list has been organized by the various phases of the implementation process. Facilities differ by platform and from facility to facility, therefore, certain activities may not apply and should be removed from the list. Other activities may be added to the list in order to complete the site plan. Once tailored for a particular site, the revised GSIP normally becomes the SIP for that site. When there is a contractor tasked to provide a SIP, the GSIP can be used to identify those FAA activities that need to be accomplished that may not be included in the contractor's SIP.

2.3 Soft Copy Support
A soft copy of the GSIP is available from the project APLNI and may be run on a PC using Microsoft Word. The project information can be easily updated and tasks and schedules can be generated by responsible individual, responsible organization, or by essential element.

2.4 Organization
The GSIP Project Resource Table divides the Essential Element Site Activities into categories by the implementation phase. The activities identified by the GSIP are referenced to the related paragraphs in the Program Implementation Plan (PIP). GSIP categories include the Item

Number, Task, PIP Reference, Responsible Individual, Time to Complete, Due Date, and
Comments.

- Number - The item number of an activity for an implementation phase.
- Description - Description of activity.
- PIP Paragraph Reference - Refers to the paragraph numbers of the Program
  Implementation Plan (PIP) where information related to the GSIP item is located.
- Responsible Individual - Refers to the organization identified as being responsible for
  the activity.

Additional Items may be added to any Implementation phase by site or region personnel that
may be required for that particular location.

Tasks within the GSIP identified as "N/A" indicate that there are no personnel requirements
identified by the site as a result of this task.

Tasks within the GSIP identified as "TBD" indicate that sufficient information is not available, it
will be updated when the information becomes available.

Number	Tasks	PIP Para Reference	Responsible Individual	Time To Complete	Due Date	Comments
	Planning Phase					
1	Identify the following: NAS CIP I.D. and JON Installation site Project Start Date Site survey date Equipment Installation date	11.0	AND-320 ANI-X40 Site POC AXX-5XX	10 hours	ongoing	
2	Coordinate funding PA for advanced project funding with Program Office as required	7.1.2	AND-320 ANI-X40	4 hours	ongoing	
3	Complete Worksheets	13.2.1.1.3	ANI-X40 AXX-500	24 hours	30 days prior to site survey	
4	Publish Site Survey checklist	13.2.1.1.4	AND-320	8 hours	Before site survey	
5	Identify TOR	13.1.4	ANI-X40	1 hour	Before Site Survey	Coordinate with site AT & AF managers.
6	Identify AT/AF regional/ site P.O.C. for ETVS	13.1	ANI-X40	1 hour	Before Site Survey	Coordinate with site AT & AF managers.
7	Identify Telecommunications requirements	6.10	ANI-X40 Site POC	8 hour	Concurrent with worksheet	
8	Identify additional AT and AF Personnel Requirements for Implementation.	3.0 4.0	ANI-X40	2 hours	Site Survey	
9	Identify site personnel training requirements for AT and AF	8.3	AXX-400 Regular training	2 hours	Site Survey	
10	Conduct Contractor site survey: power: -critical or essential -grounding, bonding, & shielding space: -installation -office -storage -loading dock area hazmat: -dust -noise	13.2.1.1.4 6.0 6.8 6.6	AND-320 Contractor AF POC AT POC ANI-X40 AXX-5XX	16 hours	Site Survey	
11	Prepare local power NCP if placed on critical power.	6.4	Site POC	8 hours	Site Survey	

Number	Tasks	PIP Para Reference	Responsible Individual	Time To Complete	Due Date	Comments
12	Identify Site Prep Responsibilities	13.2.1	AND-320 ANI-X40	8 hours	60 days after Site Survey	
13	Complete I & I brief to PASS & NATCA	8.0	ANI-X40		A minimum of 45 days prior to site prep	
14	Schedule delivery for project hardware	Appendix C	AND-320 ANI-X40 ARN-200	TBD	ongoing	This task to be completed by the Program Office in coordination with the ANI-X40 & ARN-200
15	Update Resource Tracking Program (RTP)	12.0	ANI-X40	16 hours	On-going	
	Site Preparation Phase					
1	Identify attendees for required training courses.	8.3	AF POC AT POC	4 hours	30 days after site survey	
2	Complete floor plan layout of control room: -Furniture requirements -functional arrangement of equipment -dimensional requirements -location and size of doors -clear space requirements -required locations of special electrical and mechanical provisions -height requirements	6.8	ANI-X40	40 hours	90 days before equipment delivery	
3	Complete equipment layout drawing package: -equipment name -units required (number) -dimensional requirements -raised floor requirements -impact of installation on operation of adjacent equipment -consoles modifcation -minimum access requirements - front, back, sides, top	6.8	AND-320 ANI-X40	16 hours	90 days before equipment delivery	

Number	Tasks	PIP Para Reference	Responsible Individual	Time To Complete	Due Date	Comments
4	Complete power drawing package: -approved NCP (as required) -circuit breaker panels affected - power and circuit breaker requirements -volts -amps -phase -frequency -reflected harmonics -inrush current -nominal kva -peak kva -power factor	6.4	ANI-X40	16 hours	90 days before equipment delivery	
5	Complete cabling mods drawing package: -wall, ceiling & floor penetrations -determine wire runs -unique drilling requirements -grounding, bonding, and shielding -cable tray and conduit requirements -telecommunications connection requirements	6.3	ANI-X40 AND-320	16 hours	90 days before equipment delivery	
6	Review other project implementations to identify cross-project impacts for: -facility -AF operations -AT operations -training -installation schedules	13.2	AF POC AT POC	32 hours	90 days before equipment delivery	Subject for Site Survey
7	Review and comment on contractor site survey report	13.2.1.1.4	ANI-X40 Site POC	8 hours	30 days after receipt	
8	Complete electrical installation package: -floor plan layouts -facility blueprints -grounding/bonding locations -surveys -shielding requirements -prepare CCD's	6.0	ANI-X40 AF POC	8 hours	45 days before Site prep	Provide detail installation changes to site POC for approval.
9	Order site prep material	6.9	ANI-X40	16 hours	30 days prior to site prep	

Number	Tasks	PIP Para Reference	Responsible Individual	Time To Complete	Due Date	Comments
10	Complete physical facility modifications (Site-Prep)	6.9	ANI-X40	160 hours	complete before equipment delivery	40 hours if contractor needed
11	Complete AF Training	8.3.1	AF POC	120	Prior to INCO	
12	Conduct installation team kickoff meeting:	13.0	ANI-X40 AF POC AT POC	1 hour	30 days before equipment delivery	
	INCO Tasks					
1	Complete AT Training	8.3.1	TOR ATZ	4	Prior to cutover	Additional 4 hrs required for Supervisors
2	Update AT operational procedures for new equipment & software	4.2	AXX-5XX ATP AOS	40 hours	TBD	Review with AT and AOS. Coordinate with unions.
3	Update facility maintenance operating procedures for project hardware	3.2	AF POC	8 hours	TBD	Coordinate with unions
4	Review the CAI and JAI procedures (FAA Order 6030.45) and establish team	13.2	AND-320 ANI-X40 AF POC	4 hours	Before CAI & JAI Tests	
5	Integration phase testing requirements: - Identify integration phase testing personnel - Conduct the contractor acceptance inspection (CAI) - Generate testing discrepancy list - Clear CAI discrepancies - Complete CAI	8.2 9.5/ 13.0 9.5/ 13.0 13.2.3 13.2.3	AND-320 ANI-X40 AXX-5XX	TBD	Before System Shakedown Test	
6	Develop Local Test Plan procedures: - OT&E / Field Shakedown Test Plans	9.0	Reg. AF Div	40 hours	Before System shakedown Test	
7	Update facility drawings to reflect current "as built" configuration	13.2.4	ANI-X40	24 hours	Prior to JAI	
8	Establish Facilities Reference Data File (FRDF)	5.0	ANI-X40 Site POC	40 hours	Prior to JAI	
	Integration Phase					
1	Conduct integrated OT&E testing	13.2.4	ANI-X40	40 hours	Prior to JAI	

Number	Tasks	PIP Para Reference	Responsible Individual	Time To Complete	Due Date	Comments
2	Generate trouble reports	9.5.2	AND-320 AF Sector ANI-X40	TBD	Before completion of JAI	
3	Clear trouble reports	9.5.2	AND-320	TBD	Before completion of JAI	Program Office is responsible for clearing trouble reports
4	Achieve IOC	13.2.4	ANI-X40	N/A		IOC can be declared upon completion of OT&E tests
	Field Familiarization Phase					
1	Identify shakedown testing personnel	13.2.5	Site POC	2 hours	Before equipment delivery	
2	Complete shakedown test training	8.3	ANI-X40	40 hours	Before System Shakedown	
3	Conduct shakedown testing	13.2.5	ANI-X40 Local AF Local AT	40 hours	TBD	
4	Generate trouble reports	13.2.5	ANI-X40	10 hours	During field shakedown test	
5	Clear trouble reports	13.2.5	AND-320 Contractor ANI-X40	TBD	TBD	Program Office is responsible for clearing equipment-related trouble reports - time to complete depends on the number and nature of problems identified.
6	Conduct cutover planning meeting	13.2.5.1.2	ANI-X40	4 hours	Prior to ETVS cutover	
7	Complete pre -cutover activities	13.2.5.1.2	ANI-X40 Site AF	TBD	Prior to ETVS cutover	
8	Conduct ETVS cutover	13.2.5.1.2	ANI-X40 Site AF AND-320 Contractor	TBD		
9	Conduct ETVS cutover outbrief	13.2.5.1.2	ANI-X40	2 hours	After completion of ETVS cutover	

Number	Tasks	PIP Para Reference	Responsible Individual	Time To Complete	Due Date	Comments
10	Conduct JAI	13.2.5.1.3	ANI-X40 TOR Local AF	16 hours	After completion of ETVS cutover	Length of JAI will depend on size of ETVS system and level of site involvement.
11	Declare ORD	13.2.5.1.4				
12	Clear JAI exceptions	13.2.5.1.3	AND-320 Contractor ANI-X40	TBD	TBD	Program Office is responsible for clearing equipment-related trouble reports - time to complete depends on the number and nature of problems identified.
	Equipment Removal Phase					
1	Replaced equipment removal and disposal	13.2.7	AND-320	8 hours	After ORD	

APPENDIX B: ACRONYM LIST

A/G	Air-to-Ground	2
AAS	Advanced Automation System	10
AC	Alternating Current	32
AF	Airway Facility	15
AFSS	Automated Flight Service Station	23
APLNI	Associate Product Lead for NAS Integration	5
ARC	Acquisition Review Committee	11
AT	Air Traffic	7
ATC	Air Traffic Control	3
ATCT	Airport Traffic Control Towers	7
ATIS	Automated Terminal Information Service	8
ATS	Administrative Telephone System	24
BOP	Basic Operator Panel	4
BS	Basic System	25
C	Centigrade	31
CA	Common Answer	2
CAI	Contractor Acceptance Inspection	15
CATTS	Computerized Air Traffic Training System	49
CCB	Configuration Control Board	78
CCD	Configuration Control Decision	6
CHI	Computer-Human Interface	45
CM	Configuration Management	11
CMP	Configuration Management Plan	77
CMTP	Contractor's Master Test Plan	89
COS	Colorado Springs, CO	51
COTR	Contracting Officer's Technical representative	47
COTS	Commerical-Off-The-Shelf	48
CSA	Configuration Status Accounting	78
CSAR	Configuration Status Accounting Reports	78
CSCI	Computer Software Configuration Item	79
CTD	Communications Traffic Data	8
DA	Direct Access	2
DEA	Drug Enforcement Agency	12
DoD	Department of Defense	11
DRR	Deployment Readiness Review	60
DT&E	Developmental Test and Evaluation	55
DTMF	Dual Tone Multi-Frequency	2
DVRS	Digital Voice Recording System	23
E&M	Ear & Mouth	3
E&R	Exchange and Repair	67
ECP	Engineering Change Proposals	78
EDFP	Engineering Data for Provisioning	83

EL	Electro-Luminescent	31
ESC	Electronic Systems Center Communications	11
ETVS	Enhanced Terminal Voice Switch	1
F&E	Facilities and Equipment	15
FAA	Federal Aviation Administration	1
FAALC	FAA Logistics Center	15
FAATC	FAA Technical Center	1
FAT	First Article Test	55
FRDF	Facility Reference Data File	17
FSR	Final System Review	84
FSS	Flight Service Station	23
FTS	Federal Telecommunications System	26
G/G	Ground-to-Ground	1
GFE	Government Furnished Equipment	30
GFI	Governement Furnished Information	74
GFP	Governmnet Furnished Property	74
GSIP	Generic Site Implementation	1
HAZMAT	Hazardous Materials	34
HCVR	High Capacity Voice Recorder	23
HVAC	Heating, Ventilation, and Air Conditioning	31
HWCI	Hardware Configuration Items	79
Hz	Hertz	33
IA	Indirect Access	2
IC	Intercom Calls	2
ICSS	Integrated Communications Switching Systems	10
IDF	Intermediate Distribution Frame	5
ILSP	Integrated Logistics Support Plan	15
IMT	Implementation management Team	85
INCO	Installation and Checkout	89
IntraNets	Intra-LATAn Networks	25
IOC	Initial Operating Capability	15
IOT&E	Independent Operational Test and Evaluation	51
IP	Interphone Calls	1
ISDN	Integrated Services Digital Network	8
ISP	Integrated Support Plan	83
JAI	Joint Acceptance Inspection	15
KDP	Key Decision Point	11
LATA	Local Access and Transport Area	25
LCD	Liquid Crystal Display	5
LCN	LSA Control Number	83
LINCS	Leased Inter-facility NAS Communications System	25
LRU	Line Replaceable Unit	4
LSA	Logistics Support Analysis	83
MB	mega bits	49
MCF	Metroplex Communications Facility	11

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MCVR	Multi-channel Voice Recorder	23
MDT	Maintenance Data Terminal	16
MetroNets	Metropolitan Area Networks	25
MIS	Management Information System	8
MNS	Mission Need Statement	11
MOA	Memorandums of Agreements	11
MPS	Maintenance Processor Subsystem	10
N/A	Non Applicable	5
NAILS	National Airspace Integrated Logistics Support	76
NAS	National Airspace System	5
NCP	NAS Change Proposal	23
NDI	Non Developmental Item	7
NWS	National Weather Service (NWS)	12
O&M	Operations and Maintenance	41
ORD	Operational Requirements Document	8
OSTS	Operations Support Telephone System	7
OT&E	Operational Test and Evaluation	43
P^3I	Pre-Product Impovement Items	1
PA	Project Authorization	41
PABX	Private Automated Branch Exchange	26
PAT	Production Acceptance Test	55
PAT&E	Production Acceptance Test and Evaluation	55
PDO	Property Disposal Officers	97
PGC	Provisioning Guidance Conference	84
PIP	Program Implementation Plan	1
PM	Preventive Mainenance	15
PM	Program Management	75
PML	Project Matial List	87
PMMS	Project Material Management System	87
PPL	Provisioning Parts List	83
Pre-INCO	Pre-Installation and Checkout	47
PRR	Procurement Readiness Review	11
PSR	Preliminiary System Review	83
PSTN	Public Switched Telephone Network	26
PTR	Program Trouble Report	16
PTT	Push-to-Talk	3
QA	Quality Assurance	78
QCSP	Quality Control System Plan	76
RAM	Random Access Memory	49
RAPCON	Radar Approach Control Facility	97
RAPM	Regional Associate Program Manager	43
RE&D	Research, Engineering, and Development	44
RFP	Request for Proposals	11
RMM	Remote Maintenance Monitoring	7
RMMS	Remote Maintenance Monitoring System	8

RMS	Remote Monitoring Subsystem	8
SBA	Santa Barbara, CA	51
SIIATD	Site Installation, Integration, and Acceptance Test Document	30
SIMP	Site Installation Management Plan	88
SRAD	System Requirement Allocation Document	67
STVS	Small Tower Voice Switch	10
TCS	Tower Communications Switch	10
TED	Touch Entry Device	5
TED	Touch Entry Display	31
Telcon	Teleconference	81
TEMP	Test and Evaluation Master Plan	60
TGC	Training Guidance Conference	84
TIE	Transition Implementation Exchange	1
TIM	Technical Interchange Meetings	76
TM&O	Telecommunications Management and Operations	42
TOR	Technical Onsite Representative	46
TPRC	Test Policy Review Committee	60
TRACON	Terminal Radar Approach Control	4
TRR	Test Readiness Review	85
TSR	Telecommunications Service Requests	88
TVSR	Terminal Voice Switch Replacement	10
USAF	United States Air Force	11
VHF	Very High Frequency	19
WJHTC	William J. Hughes Technical Center	51

APPENDIX C: SITE DEPLOYMENT SCHEDULE

Appendix D (refer to section 11.2, Deployment Schedule) contains the proposed site deployment schedule. Delivery dates will be coordinated between the Integrated Product Team and the individual Regions. The Material Delivery Forecast Module (MDFM) carries the most current data available on system deliveries.

The ETVS Delivery Schedule is currently being revised. The new schedule will be available shortly after the In-Service Decision.